Volume XXXII. APRIL 15, 1904. Number 8

GLEANINGS IN BEE CULTURE

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THE A. I. ROOT CO.
MEDINA OHIO
U.S.A.

Western Edition.

ENTERED AT THE POSTOFFICE, AT MEDINA, OHIO, AS SECOND CLASS MATTER.

Have You Lost Your Bees?

Save Your Combs. The winter losses in some parts of the country are heavy, and the demands for bees and queens will be large. Parties needing queens should send their orders at once, and state date when shipment is desired.

Early Italian Queens. We are fortunate in being able to offer for April and May delivery a large stock of queens from our Southern breeders. While we have a much larger supply than ever before, it is highly important that you send your order at once to secure the queens when desired, as we fill orders in rotation. We expect to be able to furnish untested queens from our Southern yards, in any number, after April 10. **Send your orders at once.**

Prices of Pure Italian Queens.

	1	12	50	100
Untested	$ 75	$ 8 50	$ 35 00	$ 65 00
Select Untested	1 00	11 50	47 50	77 50
Tested	1 50	17 00	70 00	130 00
Select Tested	2 50	28 50	———	———

Prices of Red-clover and Honey Queens.

Untested	$ 1 00
Select Untested	1 25
Tested	2 00
Select Tested	3 00
Breeding Queens	5 00
Select Breeding Queens	7 50
Extra Select Breeding Queen, one year old	10 00

We book orders, and fill in rotation.

Imported Italian Queens.

We are prepared to furnish from the best breeders in Italy, imported Italian queens. They are put into our own yards and tested before sending out. We have only two grades—best, and fair imported, and the prices are:

Best Imported.....$5 00 Fair Imported.....$3 00

Nuclei and Colonies of Bees.

We are prepared to furnish one, two, and three-frame nuclei, and full colonies of bees in eight-frame Dovetailed hives or Danzenbaker hives. The nuclei are put up in light shipping-boxes made of basswood, the sides of which are only $\frac{5}{16}$ inch thick, and the ends $\frac{1}{2}$ inch. The top and bottom are covered with wire cloth. This makes a very light package, affords plenty of ventilation, and is strong enough to stand shipping 500 to 1000 miles.

Any of our nuclei, even the one-frame, will make good strong colonies by fall if properly handled. The three-frame, if properly managed, can be increased four, five, six, or even ten full colonies, by fall, if bought now; and instead of having any black bees, one will have in the beginning pure Italians of the choicest stock throughout his apiary.

Prices of Nuclei.

One-frame nucleus, without queen	$2 00
Two frame " " "	3 00
Three-frame " " "	3 50
Full colony in eight-frame Dovetailed hive	7 50

We can furnish with the nuclei any queen mentioned in the table of prices of queens.

SPECIAL OFFERS.

Gleanings in Bee Culture one year, and one untested Italian queen from our Southern yards..... **$1.00**

We begin shipping at once. Orders filled in rotation. Do not ask for special arrangements; at this low price we can not make exceptions.

Gleanings in Bee Culture one year, and one untested Red clover queen..... **$1.50**

We begin shipping these queens about April 15. Orders filled in rotation.

GUARANTEE.

We agree to deliver queens in good order to any part of the United States or Canada, from April 15 to October. In case of queens valued at $5 or more, we ship in a one-frame nucleus (no charge for nucleus). If a two or three-frame is wanted, add to the price of the queen the difference in price between a one-frame and the two or three-frame. Losses must be reported on arrival.

One-frame Nucleus.

This contains a frame partly filled with brood and bees. The conditions of the hives at different seasons of the year vary so that we can not always put up nuclei in the same way; but in every case we aim to give full value. Weight, about 7 lbs.

Two-frame Nucleus.

This is just the same as our one-frame nucleus, except it has twice the amount of bees or brood, or of both. The box is larger, and holds two frames—one full frame of brood, or two partly filled. Shipping weight, about 10 lbs.

Three-frame Nucleus.

This is three times the size of the one-frame nucleus, and is made up in the same way as the one and two-frame. Shipping weight, about 15 lbs.

Full Colony.

This will contain 8 Langstroth frames in Dovetailed one-story hive—three full frames of brood, or equivalent, in six combs, and bees enough to cover fairly all the combs. No queen is furnished at the table price. Purchaser is to select the queen and add her price to that of the bees. Our colonies are all put up in new Dovetailed or Danzenbaker hives, painted two coats. Shipping weight, about 40 lbs.

We can make shipments of Nuclei from

Cincinnati, Ohio, Wharton, Tex., St. Paul, Minn.,
Medina, Ohio, Philadelphia, Pa., High Hill, Mo., Augusta, Kans.

This will give you low Express Rates.

The A. I. ROOT COMPANY,

Main Office and Works, MEDINA, OHIO.

GLEANINGS IN BEE CULTURE
A JOURNAL DEVOTED TO BEES AND HONEY AND HOME INTERESTS
ILLUSTRATED SEMI-MONTHLY
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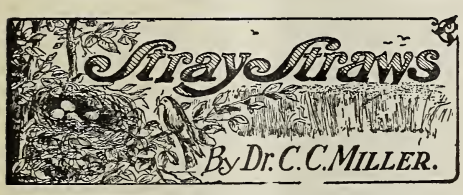


THE QUESTION is asked whether queens can not be mated in greenhouses. I think it has been tried, but not successfully.

TRANSFERRING is so little practiced in this country that we're hardly up to date in it In England more of it is done, and nowadays they transfer 21 days after swarming.

IN CUTTING candied honey with a wire, I supposed a sawing motion was used, first one hand and then the other; but page 331 reads as if a square pull with both hands at a time were used. How is it? [A slow square steady pull, without any seesawing. —ED.]

G. M. DOOLITTLE tells some things that don't look very reasonable, in that article on p. 333. Any schoolboy can reason out that bees would do about the opposite of what he says. But, reasonable or unreasonable, bees in this locality do just as he says. Of the many good articles Doolittle has written, that's one of the best.

THERE'S ANOTHER man using cleats, Doolittle, p. 327, and they run full width of hive, so a rope can be used in carrying. My hives are generally carried by one man without any rope, and in that case the full cleat is away ahead of the little one. If you want comfort in carrying hives, order them with full cleats.

E. E. STARKEY, p. 338, thinks the ventilated cover better than one with dead-air space. He's right — for Florida, and perhaps for Tennessee. In colder localities the dead air is better, because warmer in times of year when it is very important to preserve all the heat possible; and at the same time the dead-air space is very much cooler under a hot sun than a single board.

"NO SEVERE LOSSES are reported in Illinois and Iowa," p. 329. The losses are probably there, but not reported. [That is true. But we can get some idea of where losses are heaviest by the way reports come in. As I pointed out in our last issue, it is the lake regions that have suffered the most. Illinois has a very small strip of lake border and Iowa none.—ED.]

EDITOR BASSLER says in *Deutsche Imker* that he has had in an issuing swarm the old queen accompanied by her royal daughters, and he wants to know what to call such a swarm. Is it a prime swarm when it has a virgin queen, or a second swarm with the old queen? That suggests another question: When the old queen is lost, and a swarm with a virgin issues eight days later, is that a prime or an after swarm?

UNCLE FRITZ wants to know what is meant in a Straw, page 115, where E. D. Townsend says if a few more colonies are added the result will be the same as stimulating and spreading brood. Suppose a man has 90 colonies, and by stimulating and spreading he can increase his crop one-ninth; if he had one-ninth more colonies — 100 in all — he would get the same amount of honey without any stimulating or spreading. See?

HERE'S SOMETHING from *Schweiz. Bztg.* that's new—at least to me: Honey is sealed with convex cappings; after about two weeks the cappings sink down to a level surface, and later still they sink down slightly hollowing; and not till then is the ripening completed. [This is rather interesting if true, and I believe it is. I have noticed that newly capped honey has a little different appearance from that which has stood for some time. I suggest that we make this a matter of observation this summer.—ED.]

H. J. FORST moved several colonies of bees a short distance in summer. He fastened them in the hive, handled them roughly in moving, allowing full light on the bees through glass laid on top (wouldn't wire cloth do as well?), opened them after two hours of confinement in their "light

jail," blowing in smoke, and after a little flying about the old place the bees accepted the new situation. [Our own experience leads us to believe that Mr. Forst was mistaken; that many more bees returned than he supposed. Our bees have to be confined at least three days of twenty-four hours each before they will stay where they are put. We have tested this thing over and over again, hundreds of times, and it is our practice to shut the entrances up tight and keep them closed for at least three days. Of course, the beginner needs to understand that a weak colony or nucleus can be so treated without danger of smothering.—ED.]

HONEY CONSUMED in a year by a colony of bees, according to careful investigations at Swiss stations, as reported by H. Kramer, in *Schweiz. Bztg.*, varies greatly after the following table of pounds:

	Minimum.	Maximum.
October—Jauuary	4.4	11.
February—April	11.	33.
May—July	19.8	39 6
August—September	6.6	13.2
Total	41.8	96 8

That would be about 70 pounds as the average annual consumption of a medium colony. I think Doolittle puts it at about 100, and Getaz at about 200. [This is an interesting set of figures. It certainly does seems much more reasonable than those given by Mr. Getaz, showing a consumption of 200 lbs. for one year. If a colony actually consumed that amount, and gave the bee-keeper only 50 lbs. surplus, it would look as if there were a big waste somewhere. This is an important question, and it has its practical side too. Perhaps some of our experiment stations can be induced to take it up. Any further information will be gladly received.—ED.]

ACCORDING to *Schles.-Holst. Bztg.*, the bees must bring in 25,000 loads of nectar to make a pound of honey. But big loads and little loads must make that vary greatly. [Prof. B. F. Koons, of the Agricultural College, Storrs, Ct., in 1895 conducted a series of experiments, weighing not only bees but their average loads. He weighed several hundred bees, and his figures stood about as follows: 10,000 bees *could* carry one pound of honey. This was the minimum number. But he found that more often it would take 45,000 bee-loads to make a pound. His average, therefore, was 20,000 in round numbers. These figures very closely tallied with weighings made by Prof. Lazenby, of the Ohio Agricultural College, and by Prof. Gillette, of the Colorado Experiment Station. It should be said that both made their figures without the knowledge of what the other was doing, much less what had been reported by Prof. Koons. The fact that they all so nearly agree is somewhat remarkable, and proves, if it proves any thing, that they worked with wonderful precision.—ED.]

HANS had a colony of bees. Like the earnest bee-keeper he was, he went frequently in winter to see how they got along. One day they were making a good deal of noise. "Must be too cold with this miserable zero spell," said Hans. So he got rags and stopped entrance and cracks as nearly airtight as possible. A few days later he found them quite still. "Good thing I thought to shut 'em up warm," said Hans. "Now they're sleeping well." When spring came and flowers bloomed they were still sleeping.—*Bienen-Vater.* [While this seems like a good joke to the practical bee-keepers, and the result is just what we should have expected, yet there is many a beginner, just like our friend Hans, who has made the same fatal mistake. We have had reports of it in our back volumes. It is perfectly natural that one should plug a hive up to keep out the cold air. He reasons that the houses we live in have closed doors; that churches and auditoriums designed to receive hundreds and thousands of people are closed tight, and kept so for an hour or so; but he does not understand that the hive is probably hermetically sealed except at the entrance.—ED.]

M. DUCLOS tells in *Bulletin de la Meuse* that he fed a weak colony and started robbing. Notwithstanding narrowed entrance, only night brought a respite. Next day, when excitement was at its highest, he opened the entrance wide, and when the largest number of robbers were inside he fastened them in, giving plenty of air. After a week's imprisonment he opened the entrance. The robbers remained loyal to their new sovereign, all was lovely, and he had a strong colony. [This to me is a new kink, and I do not see any reason why it should not work exactly as here described. In referring the matter to my father he first said the same thing was mentioned in our A B C book. Although I have been over that volume dozens of times, and have rewritten large portions of it, I do not recall that the same thing ever appeared in it. A careful search does not reveal it, although there are similar methods, but not the identical plan here described. When I explained that, he still thought it was surely described in our back volumes years ago. But it is a good point, especially for queen-rearing yards.

J. F. McIntyre described in our A B C a robber trap that involves the same principle. When a colony is being robbed furiously he lifts the robbed hive off its stand and puts another hive just like it in its place. The entrance is provided with bee-escapes so that, when the robbers once go in they can not get out. They of course rush into the trap hive pell-mell; and when they are all trapped, quiet is restored. We know from experience that usually only one or two colonies are concerned in robbing, unless, perchance, there is general robbing throughout the yard and there is a general uproar. If there are not too many bees involved, a robber-trap will catch the whole of them, and all will be quiet.—ED.]

If any of the readers of this journal know of a friend who can make use of a bee journal printed in the Lettish (Livonian) language I shall be glad to get the address. We get a journal of that kind here, called *Mesilane*. We have received many new bee journals lately, and are trying to get a copy of all published. A large amount of literature has collected around the bee.

That well-known bee-writer, Harry Lathrop, of Monroe, Wis., not only dips his pen in the apicultural ink-bottle but in that of the muses as well. He has just published quite a number of his poems in book form. They are descriptive of Wisconsin scenery, and of life in that region. His friends will be well repaid by sending him 50 cents for a copy of the book, as Mr. Lathrop sketches right from nature. It is finely illustrated all through. The presswork is excellent.

A contributor to one of our Russian exchanges, after reading what Mr. Doolittle said in regard to combs never being too old to be of service for brood purposes, takes quite an opposite view. He found some brood comb 25 years old. The queen, in trying to lay in this, was unable to back in far enough to put an egg at the bottom of the cells, and so she laid them near the surface, on one side. E. R. R. doubts this — thinks the queen was defective.

A Russian bee-keeper took a rather novel method to ascertain which of his queens would develop the hardiest strain of bees. He put two together, when one was immediately killed. The survivor was soon afterward pitted againtst another queen, which she dispatched with neatness. Five more were tried; and as she was victorious over all rivals she was selected as the mother of a new colony. Perhaps we shall hear some time what kind of bees she produced.

A writer in *Bienen Zuchter* introduces queens in this way; and in the multiplicity of ways some may find this a good one: When I receive a strange queen I take advantage of the first fine day, and at noon I open the hive which I wish to requeen. I take therefrom a frame of brood, no matter which, covered with bees, providing the queen is not found there. I place this in a little hive which I take to the cellar. It is needless to say that I close the hive as soon as the frame is taken out. About four or five o'clock in the afternoon I give a good dose of feed to my captives in the little hive, and then, about half an hour after, when they are well gorged with honey, I smoke them lightly and place my new queen on the frame. I afterward close the little hive, leaving the feeder in it. The next day, when the bees are well at work, I carry my little hive to the apiary, look for the queen of the hive from which I took the frame of brood, kill her, and smoke the colony moderately. Meanwhile I take out the frame on which was found the old queen, and put the frame of my little hive in the place of that. I then close the hive and the game is played.

A German exchange, *Praktischer Wegweiser*, gives an interesting account of bee-keeping in Siberia. The winter lasts seven months, beginning in September and ending in May, there being no fall and spring. The snow is often ten feet deep. The principal source of honey there is basswood, of which Siberia boasts 17 different kinds, blossoming at different times. The wood of it is used for all kinds of building purposes, even for making sheds for the purpose of protecting hives. Nearly all bee-keepers there are professionals, and they select in the forest, far from any town, a convenient place for winter quarters. The hives are nearly all American pattern, set around on four posts, provided with covers, and separated from each other in such a manner as to afford easy manipulation. The colonies are strong, about 15 lbs. each, only such being kept. Swarms or seconds are united to the number of five or seven, after having taken away their queens and drones. These are kept in a cellar for four or five days, otherwise they are apt to desert. To catch runaway swarms, hundreds of common hives are suspended on the trees. The bees do not go out between 11 o'clock and some time in the afternoon, on account of the oppressive heat. A good hive will furnish about 100 lbs. of honey which sells for about 25 cents per kilogram of 2 lbs. 3 ounces. There are some apiaries in Siberia that certainly have over 1000 hives each.

BEGINNING IN BEE-KEEPING.

"Is this Mr. Doolittle, the bee-man?"

"That is what some people call me."

"My name is Jackson; and I was told that, if I would come and see you, you would tell me how best to begin bee-keeping. I have read an old bee-book by a man named Quinby, and I have become nearly crazy over bees — at least, my wife puts it in that way."

"Quinby was a good writer on bees, and I sometimes think that his 'Mysteries of Bee keeping Explained' was about as good a book, from the practical side of the matter, as was ever written."

"Then you have the book?"

"Yes. That was the book that taught me my first lessons 35 years ago, and I studied the matter the book contained until I had it by heart like a nursery rhyme. How much did you think of investing in bees?"

"I told my wife that I thought I could spare $250 for that purpose. But she rather objects. Do you think that would be enough?"

"I put in only $35, and I would not consider it good policy for the one who knows nothing experimentally about bees to put in more than $40 to $50 in starting, including bees, hives, books, papers, and all."

"Well, I do not think my wife would see anything large in that; but that would not buy many colonies."

"No; neither do you wish to buy many colonies. If you do not buy more than from two to four colonies (and the latter should be the limit, in my opinion, for the one who has had no experience in the business), $50 will cover all necessary expenses."

"How about the hives?"

"If you are a good workman, and have the necessary tools, it might be well for you to get a sample to work from, and then make your own. You may not get them quite so smooth and nice to look at as those you would buy, but for all practical purposes in honey-production they will help you to just as many dollars and cents as would those with an extra-nice finish. I would not, however, advise you to try to get out your own sections."

"Why not these as well as the hives?"

"It is doubtful whether any one, no matter how good a workman, can get out sections by hand that will in any way compare with those now on the market, nor that would be suitable to sell to consumers; but in making the rest of what you will need, you will not only be self-supporting, but this part of it will put into you an enthusiasm which will tend much toward success."

"How would it do to get a foot power saw and make the sections that way?"

"It would not pay you. When I first began bee-keeping I was charged $25 a thousand for sections in the flat; and as I thought that a high figure I purchased machinery and manufactured sections for sale. The price soon went down to $20, then to $15, then to $10, then to $8, then to $6, at which time I said, 'others can have the trade; it will pay me better to work at something else.' But I had the machinery, and so continued to get out my own till the price fell to $3.50, when I concluded that I could not afford to run my own machinery, after paying the price for the lumber which I had to at retail, if I had any respect for the worth of my time and the use of the machinery."

"What! sections as cheap as that?"

"Yes; and they went still lower, so that any one by buying in 10,000 lots could procure them at $3 00 per thousand. But since then they have advanced somewhat, owing to the scarcity of lumber; but even now you can purchase the material for 1000 sections for less than the cost was when I quit manufacturing them for sale; and, what is more, the sections which we used to pay $25 a thousand for would in no way compare with the sections which I paid the A. I. Root Company $3.00 a thousand for a few years ago. In no other one thing has there been a greater improvement along the bee-keeping line than in sections since they first came into existence. Those $25 sections were simply sawed out, and the sawing done was of a rough order. Now the Root sections are all sandpapered till they are polished almost as smooth as glass and as true as a die."

"What hive would you start with?"

"That is quite a question. It is well that you make sure that you start with a really good hive. There are several of these before the public; but should you choose the Langstroth hive, you will make no mistake; for with cellar wintering, here at the North, there is probably nothing better."

"But you think it might be well to invest more largely than the $50 after a year or so, do you not?"

"Not unless the bees earn it for you. Make your bees and yourself self sustaining; and after the first start do not pay out more than what the *bees* bring you in, always remembering that, if you can not make your four colonies pay, you can not make 400 or 4000; then if you should happen to make a failure of the business you will have the consolation of knowing that you have lost but from $40 to $50, instead of $250 to $400, or perhaps as many thousand, as some have done. There seems to be a proneness to go into the bee business recklessly, ofttimes."

"I suppose it is on account of the bee-fever. My wife tells me I have it bad; and had I not come to see you I probably should have put as much as $200 into it. How about the work part to it? I am told that there is very little to be done."

"The day is past with most people in believing the old adage that bees work for nothing and board themselves, and I do not think you believe so. If any person thinks he will realize a large income from his bees, and never look after their condition further than hiving swarms and putting on sections he will find he is making a mistake. Men do not treat their other stock that way, but care for it regularly, and the bees need care, just when they do need it, just as much as any thing else."

"What are some of the needs of the bees?"

"See your bees often, is a good thing to paste in your hat, so that you may know that they are suffering for nothing. While they are in the cellar, keep the temperature

of that cellar between 43 to 50 degrees above zero, if it is possible to do so. Then do not let the dead bees accumulate on the floor and mold there, thus making the air unfit for any animal life. And if you have any outdoors, and the mercury rises to 45 to 50 degrees in the shade, with the sun shining brightly, and the atmosphere still, let them have a cleansing flight, no matter if the ground is covered with snow. Bees can get off the snow just as well as from any other place if the air and temperature are right. See that the colonies have sufficient stores for winter in early fall, so there is no danger from their starving; and if to be wintered out, pack them and fix for winter while the weather is still mild. Put on your sections and take them off at the right time, and always crate your honey before you sell it, as this will give it a much nicer appearance. Oh! there is so much to do that, were I to tell you all at once, you would be discouraged and forget half I tell you."

"Well, but how am I to learn?"

"When you get your bees, take your Quinby book and go right out with the bees and put it in practice, and also whatever you read in the bee-paper you take, if it seems good to you; that is what you want to prove by the bees. In short, 'live with them' till you get these things learned (what you read) or proven, and that will give you the education you need. But I must leave now, as I have an appointment to meet."

THE WOULD-BE INVENTORS OF BEEDOM.

In the *American Bee Journal* for Feb. 11 appears an editorial with the above heading. As the experience of the editor of that journal is almost exactly the same as ours, I reproduce here the first paragraph:

A leading writer of sacred writ once said, "Of the making of books there is no end." Almost the same thing can be said of the making of new hives It is getting to be almost a fad in these days for certain bee-keepers to have a hive of their own. Of course, each new hive gotten up (by them) is far superior to any other, no matter whether it is half so good as some that have been thoroughly tried by the majority of bee-keepers! The strange part of it all is that the would be inventors of these new fads in hives are so queer as to think that bee-papers ought to devote half of their space to pushing the sale of these new creations. Yes, certain of them have gone so far as to order their bee-papers discontinued because the editors did not see it their duty to insist upon the bee-keeping public using their new hives. No doubt the discontinuers thought they would kill the bee papers if they stopped subscribing for them. But they might be surprised if they knew the papers *they* discontinued were having more readers all the time.

A short time ago one of our customers as much as told us that a certain hive was very much better than any thing else on the market, and that it would eventually run every thing else out of the country. He went on to say that the leaders, indicating the editors and supply-manufacturers, did not want to recognize its merits. For these and other reasons he withdrew his patronage from our journal, supposing that that act of his would bring us to our senses. Queer world, this! or, rather, there are some queer people in it.

BEE-PARALYSIS HEREDITARY; SULPHUR CURE A SUCCESS.

Mr. O. O. Poppleton, of Stuart, Fla., who gave to the bee-keeping world the first successful method of curing bee-paralysis by means of powdered sulphur, has probably had as good an opportunity for studying this peculiar disease, which had hitherto baffled all efforts at cure, as any other man in the United States. In the March issue of the *American Bee-keeper* he confirms an opinion that has been expressed many a time, that bee-paralysis is hereditary, or, rather, he goes on to state that the "disease seems to be much more prevalent in certain strains or families of bees. At least four times in the last ten years I have had to destroy utterly certain queens and all their daughters, nearly all cases in my apiary being confined to these particular bees. Certain queens seem to transmit the germs of the disease through queen daughters to their progeny."

He observes, further, that "colonies which have had the disease one season, but recovered without treatment of any kind, are much more liable to have the disease next season." And, again, "It is the old bees, the field workers, that die."

It may be interesting to mention at this time that others have followed Mr. Poppleton's method of treatment with entire success, which is nothing more nor less than sprinkling the infected combs with powdered sulphur, then repeating the treatment a week or so later, and again if necessary.

A DAMAGE BEE-SUIT IN WHICH THE N. B. K. A. COMES OUT VICTORIOUS.

In our issue for Nov 1, 1903, page 916, we gave the details of a peculiar (not to say ridiculous) suit in which a member of the National Association, Mr. J. W. Pierson, also Secretary of the New York State Association of Bee-keepers' Societies, was made the defendant in a case in which it was alleged that a horse belonging to the plaintiff was stung by the defendant's bees. It is said that the plaintiff would have never begun the action but for a certain attorney, and there are plenty of them ready to appeal to prejudice. Some very queer statements were made in the petition. The plaintiff (or, rather, his attorney) averred that his horse was in the clover-field pasturing; that the bees were working heavily on the clover; that subsequently the horse was found fast in a barbed-wire fence, its nose

and lips swollen, and that "it had crazy spells." A veterinary was called, and he at first called it a case of lockjaw; but, possibly after he had been "posted" by the aforesaid attorney, he reversed the opinion, and called it a case of bee-sting poison. Other veterinaries were called by Mr. Pierson, but they did not agree that the symptoms indicated stinging. Among other foolish assertions, the petition set forth that the defendant well knew that the bees were "ferocious by nature;" "liable to sting animals and mankind;" that he had no right to keep them, and that he should have kept them in their hives, etc. Well, how the Association and Mr. Pierson came out victorious is explained in the following, just received from Mr. Pierson himself:

The plaintiff, Frank Lockwood, a resident of Cayuga Co., N Y., sued the defendant, J. W. Pierson, a neighboring bee keeper and member of the National Beekeepers' Association, in justice' court, for the value of a horse which, he alleged, "was stung and so injured by the defendant's bees, on or about the 20th of June, 1903, that she died." Issue was joined, and the defense, aided by the N B K. A., successfully defended the case The plaintiff, Lockwood, after one trial in justice's court, asked for a discontinuance, which was granted upon his payment of such costs as were legally chargeable to him.

ANOTHER VICTORY FOR THE ASSOCIATION.

Just as we go to press the following has come to hand:

MILLSBORO, DEL., April 13, '04.

GENTLEMEN:—The suit of Wimbrow Bros against Francis Dryden, bee-keeper, for the loss of a pair of mules stung to death summer before last, was decided in court yesterday by non-suit. He. Dryden, had not been notified by town board to remove them was his defense, and the team was driven into a field and left standing within a few feet of them.

G. L. ELLIS.

POSSIBILITIES OF BEE-KEEPING IN TEXAS, THAT PARADISE FOR BEES.

OUR readers will remember that, some time ago, after visiting Uvalde Co., Texas, I referred to it as being a paradise for bee-keepers. At the time some questioned the statement, thinking I had overdrawn it. In "Ten Texas Topics" is an article by Mr. Udo Toepperwein, in which he quotes from one of the prominent honey-producers of his State. From two paragraphs of it I make the following extract:

Uvalde is now shipping honey by the train-load, and the bee keepers there, as well as in a number of neighboring counties, are actually getting rich at the business. It will not be many years before all the hollow trees are cut, the caves robbed, and the bees put into up-to date hives; and then we may expect the producing of honey to be one of our chief industries. It may surprise some to know that even now there are bee-keepers in Texas who own over a thousand colonies of bees. Within a few years such a number will not be an unusual thing.

As those who are informed know, according to the last census Texas is the leading State in the production of honey and the value of apiarian products In 1899 there was produced in Texas 4 780,254 pounds of honey and 159,690 pounds of beeswax, valued at $468,527 60. We produce nearly a million pounds more of honey than any other State; and bee-keepers from other sections, who are aware of our advantages, are locating every year in our midst. In nearly every portion of Texas bee keeping pays; but it finds its best place in South and Southwest Texas, where the flora is so extensive and so well adapted to the production of honey. Texas has never known an entire failure in the honey crop, which is something that can not be said of any other State. For these reasons I believe South and Southwest Texas to be the best bee country in the world, and a section in which entire confidence can be placed in the production of a honey crop every year, thus making it a staple and certain source of revenue to those engaged in it As yet there are millions of acres in this section where no bee has ever yet made its appearance, and the opportunities and prospects for development are unlimited.

So far as I am acquainted with the field referred to, the statements made are not far from the truth. One of my Texas friends says it is literally true — every word of it.

Uvalde Co. has now all the bee-keepers and bees it can support. But there are other counties, sparsely settled, that have conditions very similar to those afforded by Uvalde, and these would support bees and bee-keepers. The only question that remains is whether the tenderfoot would care to leave home and friends and go into a sparsely settled field that seems almost like a desert, even though it may be a paradise for bees. The scrubby plants or trees of the catclaw, mesquite, and guajilla do not look as if they would yield any honey; but the fact that Uvalde Co. is shipping out honey by the train-load is significant.

WINTER LOSSES UP TO DATE.

WINTER losses throughout the northern portion of the country are about the same as reported in our last. Michigan and New York, as before, lead off with the heaviest mortalities. Reports are beginning to come in from Canada, showing losses both in Ontario and Quebec — much heavier than usual. Some of the States along the Atlantic coast are reporting anywhere from 30 to 90 per cent of the bees dead. The losses still seem to be confined mainly to bees wintered outdoors, and to those bee-keepers who have had a short experience.

THE OHIO FOUL-BROOD BILL.

THE Herrick foul-brood bill, as amended, passed the Ohio Senate last Tuesday, April 12. It was discovered, while in the Senate committee, as it came from the House, that there was one little feature in it that was unconstitutional. This was amended, and was then passed by the Senate, and now goes back to the House for concurrence, where it will undoubtedly pass.

A. I. Root was present in the Senate when the bill came up for consideration. One Senator seemed to think it was a piece of class legislation that would benefit only a very few bee-keepers, and endeavored to convey the impression that it should give place to more important measures that were up for consideration. Another Senator, and he was backed by many others, said he had received more letters and telegrams concerning this bill than he had for any other measure that was up for consideration in the Senate, and he made a strong plea for the bill. This only goes to show that GLEANINGS readers carried out my request to write to their Senators in a way that made itself *felt tremendously*. Further announcements will be given later.

SULPHURIC ACID CAN NOT BE ELIMINATED FROM COMMERCIAL GLUCOSE OR THE SO-CALLED CORN SYRUP, SAID TO BE "BETTER THAN HONEY."

In our last issue reference was made to the statement, now going the rounds of the press, that John D. Rockefeller would give half a million of dollars for a process by which all the sulphuric acid could be removed from corn syrup or glucose. At the National Bee-keepers' convention which met in Chicago in August, 1900, a paper was read by Mr. Thos. W. Cowan, editor of the *British Bee Journal*, one of the leading scientists in all beedom, on the general subject of the chemistry of honey and how to detect its adulteration. From this paper I make two or three extracts that go to show *why* Mr. Rockefeller makes his offer so very large. The following are the extracts:

Starch or corn syrup, known commercially as glucose, differs in almost every respect from honey. It throws down abundant precipitates with lead and barium solutions, and often with alcohol. It does not ferment completely, but leaves about one-fifth of its weight as unfermentable gummy residue, and examined by the polariscope, it turns the ray of light powerfully to the right.

Glucose is prepared on a large scale from corn starch. The transformation is usually effected by boiling with dilute sulphuric acid. The excess of acid is removed by treating the solutions with chalk, and filtering The filtered solutions are evaporated to a syrupy consistency, and sent into the market under the names of glucose, corn syrup; or to dryness, the solid product being known in commerce as grape sugar.

If in the treatment of starch with sulphuric acid the transformation is not complete (and this is usually the case), the product is a mixture of dextrose, maltose, and dextrine. It is generally quite easy to recognize the acid which has been used to convert starch into glucose. In the laboratory it is quite possible to make pure glucose, and remove every trace of acid; but commercially it is practically impossible by subsequent precipitation of the product to get rid of this acid, and, as a consequence, it appears in the honey which is adulterated with it; and by adding to a clear solution of honey containing such glucose a solution of barium chloride, a white turbidity at once makes its appearance, varying in density with the quality of the corn syrup present and the state of its purity.

Note that Mr. Cowan says that, "in the treatment of starch with sulphuric acid, the transformation is not complete; . . that it is generally quite easy to recognize the acid which has been used to convert starch into glucose." And, again, "In the laboratory it is quite possible to make pure glucose, and remove *every trace of acid; but commercially it is practically impossible.*" Italics are mine. Thousands of dollars have been expended in the attempt to remove every trace of the acid from the commercial product, but so far without success.

Note again that Mr. Cowan, despite the statement of the venders of these cheap corn syrups, to the effect that they can not be distinguished from honey, says: "Corn syrup, known commercially as glucose, *differs in almost every respect from honey*" — italics mine again. Yet I suppose there will be millions of copies of advertisements in all the leading papers, that will tell you a certain brand of corn syrup "is honey," and "is better than honey" — two statements that are somewhat contradictory to say the least. How can any thing be better than itself? The second quotation is a plain acknowledgment that the stuff *is not honey*.

It will not be long before the public will learn this brassy taste, and will associate it with sulphuric acid that is found to do damage to the stomachs of the ignorant and unsuspecting, to say nothing of the innocent children who are given the stuff because it is "cheaper than honey." Verily, has it come to pass that the "almighty dollar" must come between us and our children?

If Mr. Rockefeller is offering half a million dollars for a process by which he can eliminate the sulphuric acid from his corn syrup, we hope the papers of the country will herald the fact from New York to San Francisco, and from New Orleans to Portland. Let the dear people understand just what they are getting; then if they buy it with a full knowledge of what is in the stuff they will have no one to blame but themselves if they have "disordered stomachs." But methinks they have too much respect for their health. A wise man says you can fool a part of the people all the time, but not all the people all the time.

We do not need to worry about those big flaming advertisements of corn syrups "better than honey." The people will not be fooled long.

KEEP MORE BEES — IS THE ADVICE GOOD?

In the *American Bee Journal* for March 31 appears an article from our friend G. M. Doolittle on this subject. Among other things he says:

Not long ago I saw a statement in print from quite a noted bee keeper, that it took 200 lbs. of honey to carry a colony of bees through a single year. This is a greater consumption of stores than I had believed possible. My estimate has been that 100 lbs. is sufficient for all the needs of any single colony during a year, and so to be on the conservative side I will call my estimate, or half of what the writer gave, as the amount needed to keep one colony of bees one year, as the right amount. Then the question which comes to us is this Which is the cheaper, a little extra manipulation, or the extra colonies, hives, etc., and the *honey* that they consume?

Suppose that 100 colonies produce an average yield of 50 pounds each of surplus honey for their keeper, and by so doing secure all the nectar in a given field, year by year This will make 5000 pounds of surplus as the apiarist's share of the field, while each of the 100 colonies will use 100 pounds each, or 10,000 pounds as a whole, as their share to carry them through the year. Thus we fail to secure to ourselves only a one-third share of the honey from our field, by employing an extra number of colonies

On the other hand, if we employ the management or economy plan which many of our best farmers do, and the plan adopted almost universally by our English friends—that of securing the same amount of produce off of *one* acre of land that many of our Americans do from three or four acres—we shall find our question stated thus: 15 000 pounds is the product of our field; 50 colonies are all that are needed with good management to secure this whole yield. Then 50 colonies must use 5000 pounds of this for their support, thus leaving 10 000 pounds for the manager. None but the most prejudiced can help seeing from this that the manager gets 5000 pounds of honey for his manipulation and uses little if any more time than he would use on the 100 without manipulation; hence from the standpoint of overstocking a field, the *management plan* is 5000 pounds ahead of the other plan of keeping an extra number of colonies, and proves that Mr. Townsend's doctrine is not correct.

If I mistake not, Mr. Hutchinson, of the *Review*, has been a most strenuous advocate of keeping "more bees;" but so far as I have read his editorials he does not advise that in doing so a locality should be overcrowded to the extent that the average per colony should be cut down, but that the additional bees should be scattered in various outyards, each having no more colonies than the locality will support. On the other hand, there is just a little danger that some of our friends may go too deeply into bee-keeping, and it is perhaps wise to call a halt ere some wade into water beyond their depth. Many a person can handle a few chickens, and get good results; but when he runs the number up into the hundreds he meets with failure and disaster. Some of our friends have done remarkably well with a few colonies; but when they have attempted to double or treble the number they entered into a business proposition that proved to be rather too much for them.

Many years ago a neighbor of ours cleared a thousand dollars from one acre of onions. It made him wild. He bought ten more acres of the same kind of onion land, going into debt for it, and expected to clear the following year $10,000. When he managed the one acre he did all the work himself. When he worked the ten acres he had to hire help. The help was incompetent, or did not understand. Onions fell in price; and at the final roundup that year he had a great stock of poor onions without a buyer. They rotted. He became discouraged, and lost lost all he had, and more too.

Now, while I indorse Mr. Hutchinson's advice to "keep more bees," I have been fearful that a good many, on account of a lack of experience or lack of business ability, not understanding their own limitations and those of their localities, would plunge in too deeply and meet with disaster. There are, undoubtedly, some people who can keep more bees by scattering them in outyards, and if they have the requisite training and business ability they would make more money. But where we find one person who can manage 500 colonies or more successfully, there will be dozens of others who can not go much beyond the 200 or 300 mark. The same rule applies to any business. But if I understand Mr. Hutchinson he does not advise that *every one* should keep more bees. He would be unwise if he did.

Now let us look at the other side of the question — the side of expansion. Perhaps here is a bee-keeper who has 300 colonies. During the busy season he is comfortably busy. But during six months in the year his time is not very profitably employed—a distinct loss; for it will take him only a short time, comparatively, to get his supers ready for the next season, nail his hives, repaint them, or do other preliminary work that can easily be done indoors, and yet his interest, or his rent and his living expenses are going right on. Suppose, for example, that this bee-keeper has 600 colonies, or 1000; that he has good business ability; that he has plenty of bee-range. Suppose he scatters this number in 15 different yards, none further than 15 miles from his home, and a good part of them not over four or five miles away. In the busy season he will, of course, have to employ help. If he has the right kind of executive ability he will see that that help is profitably employed. When the rush of work is over he can look after the marketing of the crop, put the bees into winter quarters, perhaps doing the work himself with the occasional help of one man and a team. In cold weather he can devote *all* of his time profitably to preparing for the next season. Now, while he is operating 1000 colonies it costs him no more to live; the same horse and wagon that will carry him to two or three hundred will carry him to the other seven or eight hundred. If he is running for extracted honey, the same extractor, uncapping-knives, and smokers, can be used at each yard. He is thus enabled to put his invested capital where it will be earning money for him *all the time* in the busy season instead of eating up interest part of the time. We will suppose that some of his swarms get away from him; we will also suppose that some of the work is not done as well as when he had only 300 colonies; but he has increased his honey crop by three times, possibly, and has increased his actual operating expenses only to the extent of the help that he has to pay for, extra hives, and sugar to feed. A couple of men and a boy three months in the year — the man at $2.00 and a boy at $1.00 per day would make this expense $450. To this we will add $50 00 for extra team hire. The cost of the extra 700 colonies with hives and supers divided by ten (assuming that they would last ten years) would be $250 more, or $750. But we must add $250 more for sugar for feeding, and $250 for sections, foundation, and shipping cases, making $1250 as the total added expense for the 700 extra colonies. Say he is producing comb honey, and that he can average 35 lbs. per colony. If this nets him 10 cts. he would get from 300 colonies $1050. If he has 1000 colonies his gross income will be $3500 by adding only $1150 to his general expenses.

This is a supposable and a possible case. The most that I would show is that the operating and overhead expense will not be proportionately increased if the number of colonies be doubled or trebled — all on the assumption, of course, that our bee-keeping friend has the necessary skill and business ability.

In deciding the question whether we ourselves should keep more bees, we should go very cautiously; not increase the number all at once, but a little at a time, *making the bees pay their way*. Generally speaking, it would be the biggest piece of folly for one to borrow the money and treble his equipment of bees and hives in one season.

THE COMPOUND EYES OF THE BEE.

A Scientific Examination of this Wonderful and Complicated Organ.

BY E. F. PHILLIPS.

An examination of the large compound eyes of a bee will show that the outside is made up of hexagonal areas, thousands in number. Each of these hexagons is the outside of one of the elements of which the compound eye is composed; and, since they are all constructed alike, a description of one will serve for all. Each of these elements is called an ommatidium. If, then, we take a section through one of the compound eyes parallel with the top of the head of the bee we shall get some of these cut lengthwise, and these show best the structure, although it is also necessary to cut other sections at right angles to this plane in order to get the shape of some of the parts. The figures which accompany this will show the ommatidium cut lengthwise, and at the side smaller figures showing a section at right angles at the points indicated by the dotted lines. Another figure shows an ommatidium from a sealed larva, or, more properly called, the *pupa* stage, since the word *larva* should be applied only to the *unsealed* brood.

The outside portion, already mentioned, is the lens layer, *a*, and is composed of chitin, as is all the rest of the outside covering of the bee. The section shows this as cut, so that only two sides of the hexagon are shown, while the smaller figure shows the hexagonal shape. This lens layer is secreted by the two small cells, *b*, which show much more clearly in the pupa stage before the chitin is formed, since they keep getting smaller and smaller as the bee grows, until they finally remain only as very small remnants.

The next lower structure is the crystalline cone, *c*, which is composed of four cells, of which only two show in the long section. In the pupa stage the boundaries are much clearer, and the nuclei larger than they are in the adult eye. This cone is clear, and, like the lens above it, gathers in the light rays so that they can act on the nerves below just as the lens in the human eye gathers together rays of light so they can affect the nerves behind it.

Directly in line with the cone is a long rodlike structure which runs clear to the bottom of the ommatidium, called the "rhabdome," *d*. This probably contains the ending of the nerves which are sensitive to light. Around the rhabdome are eight retina cells, *e*, which have poured out a secretion while in the pupa state to form the rhabdome. In Fig. 2 the rhabdome is shown as only partly formed, and the retina cells come together below it.

Around the cone and retina cells there are pigment-cells that keep the light from passing from one ommatidium to the other, and thus making a confused image, just as the inside of a camera is painted black to avoid reflections. In the human eye we also find pigment, which is located just behind the nerve-endings, and answers the same purpose.

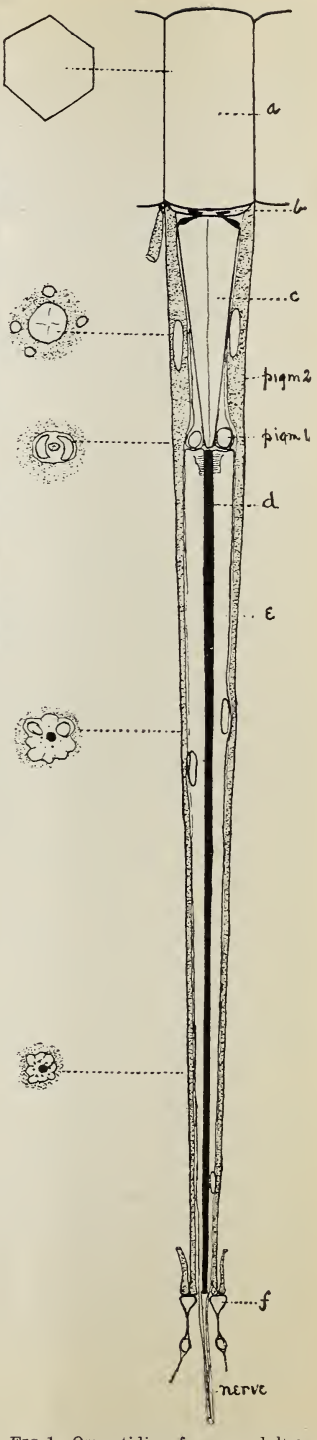


FIG. 1.—Ommatidium from an adult eye of the bee; a, lens; b, lens secreting cells; c, cone; d, rhabdome; e, retina cells; f, bottom layer cells.

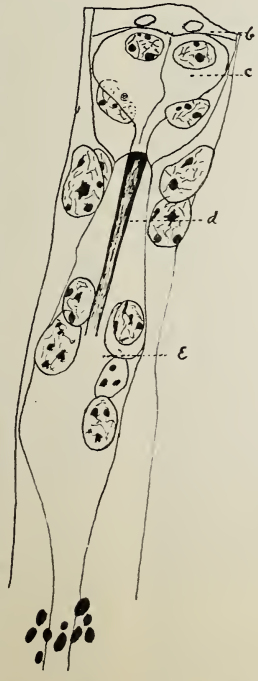


FIG. 2.—Ommatidium from eye of pupa of bee. Letters same as Fig. 1. Scale about twice as large as Fig. 1.

There are two kinds of these pigment-cells. The ones at the base of the cone, *pigm.* 1, are two in number, and do not extend below the base of the cone. The other pigment-cells, *pigm.* 2, extend from the lens to the base of the ommatidium, and are twelve in number. The pigment in these cells is located principally at the outer portion of the eye; and the retina cells also contain pigment, thus making a complete sheath of pigment around the nerve and nerve-endings in the middle.

The nerve-lines of the eye extend down along the eight retina cells, and at the bottom come together, and the united nerve extends toward the brain. These eight nerves are shown in the cross-section as dots, and are omitted in the longitudinal section, since I did not wish to make the figure too confusing by putting in too many parallel lines.

The small triangular cells, *f*, which have projections from them, are not nerves, but form the bottom layer of the eye.

I wish to explain here that the small drawings at the side of Fig. 1 are cross-sections of the ommatidium at points indicated by the dotted lines.

I have given here briefly the structure of the eye, avoiding as far as possible the use of technical terms, and hope that the readers of GLEANINGS will be able to get an idea of what a compound eye really is. The technical terms of bee-keeping are Greek to an outsider, and the same is true for any other line of work; but I have, as far as possible, explained the terms used.

Grenacher was the first to work out this structure; and in "The Honey-bee," by Cowan, will be found a figure from his work, with a description. He does not, however, give the entire structure, and there are certain errors in his work which the advance in the methods of work makes it possible to avoid now. I would not attempt to detract from the value of the work of this great zoologist, for his work will always stand as a marvelous advance in science; but zoological methods have been improved recently to such an extent that it is now possible to obtain more accurate results.

My apology for taking up room in GLEANINGS with material which is of no use from a practical standpoint is that I feel that, the more a bee-keeper knows about the bee, the better he is. A man who cares simply for the amount of honey he gets and the dollars which come from its sale, may be a fine bee-keeper, but surely he misses a great many of the good things of life by limiting his range of vision in this way. In all the group of insects there is none of more interest than the honey-bee; and narrow indeed is the man who can work with them day by day and not have a desire to know more of them.

Philadelphia, Pa.

[The article above will be followed by another one in our next issue, by the same writer, on the relative size of drones and workers.—ED.]

BEE MATTER.

Screening the Wheat from the Chaff; Sheep in Bee Yards; Shaking for Foul Brood.

BY CHARLES B. ACHARD.

On page 22 Mr. Louis F. Wahl asks for some method of keeping track of the good things in the bee-journals so we don't forget. I would refer him to GLEANINGS, page 49, 1903, where Mr. Doolittle gives his plan for "separating the wheat from the chaff." After reading Mr. Doolittle's suggestions I thought out a little different plan for my own use. I got a plain "Macey" card-index box, also one set of alphabet index-cards, and about a hundred blank cards. Whenever I come across any thing in a bee-journal that I think I might wish to refer to afterward I mark the article, or part of it, with pencil. About once a month I look the papers over and note the subject, name, page, and volume of the bee journal on the card, allowing a separate card for each subject. For example:

Wintering, requirements for successful—*Rev.*, 102, 1903.

Wintering, ventilation—*Rev.*, 114, 1903.

Queens, introducing—*Gl.*, 376, 545, 1903.

Queens, introducing, shower-bath method—*Gl.*, 185, 1903.

In this way, if I wish to look up any valuable suggestion it takes but a few seconds to find what I want. Perhaps you may think I would soon have hundreds of cards filled; but I find that, during the whole of last year, I used but a few over 100 cards, and they are, most of them, not half full, as I can put ten to twelve items under a given subject on one card. I take four papers—the *American Bee-keeper*, *American Bee Journal*, *Review*, and GLEANINGS, and I think the average bee-keeper takes no more than that.

On p. 31 Mr. C. J. Pearse would like to know about keeping sheep in an apiary, to keep down the grass. I tried a sheep in my apiary last season. Although I had a few dwarf fruit-trees planted among the hives, I thought if the lamb had plenty of grass it would not eat the foliage of the trees; but it did, nevertheless. One thing I would warn friend Pearse of: Let him be sure that the sheep are not bothered with lice or ticks. They find the corners of the hives an excellent place to relieve that itchy feeling, as I found out to my sorrow. I wonder if there are any readers of GLEANINGS who have tried sheep for keeping down the grass.

Last summer I had a little experience in fighting foul brood, and learned a lesson or two. Most instructors advise us to shake the bees on foundation in the evening, just before dusk. I did so. No sooner was the sun below the horizon than I commenced to shake the bees in the usual manner. But, oh my! how they went for me! Instead of running into the hive after being shaken in front of the entrance, they flew up into the air and attacked me from all sides. I re-

ceived at least a dozen stings in different parts of my body. I used only a moderate amount of smoke.

Next evening I began about 20 minutes earlier. Every thing went well until the sun had sunk beneath the horizon, when the "fun" started all over again. Hereafter I shall shake no more bees after sundown—lesson number one.

The next thing the books and wise men say is, starve the bees three or four days. As I could not let the bees starve unless I confined them in the hive, I put a strip of wire cloth across the one-inch entrance, and raised the cover about an eighth of an inch, and also shaded the hive besides; but in spite of that, about a pint of bees perished in each hive treated—either starved to death or suffocated, or both. *Now* I know it would have been the proper thing to put the bees into the cellar or some other dark cool place—lesson number two.

Last year was my second season, and so I am but a beginner in the bee business. I ended the season with eleven colonies, five of which I am wintering outdoors with a deep telescope cover for protection (I am using the Danzenbaker hive with an empty super underneath the brood-chamber). They seem to be doing well, although they have not had a chance to fly since Thanksgiving. So far, this winter has been severe.

Roselle, Ill., Jan. 8, 1904.

[Sheep can be used for keeping bees down in a bee-yard, but there should be no foliage or low shrubbery which it is desired to preserve, for them to get at. A sheep will eat almost any thing green. He likes variety, and will nibble at choice shrubbery, especially grapevines. In some yards sheep are used to very good advantage for keeping down grass.

You need have no trouble about shaking after sundown, providing you use proper precaution. While bees are apt to be more nervous toward the cool of the evening, yet they can usually be made very tractable by blowing smoke in at the entrance and over the frames. After the first frame is pulled out, they can usually be handled without trouble. If they are very "touchy," blow a breath of smoke on each side of the frame before shaking.

In the case of strong colonies it is a little risky to close the entrance up with wire cloth if the weather is at all warm. In hot weather, bees are quite inclined to cluster out at night; and a closed entrance is liable to result in suffocating many bees.—ED.]

QUEENS MATING TWICE.

Some Interesting Data on the Question.

BY PROF. FRANK BENTON.

In my note-book for 1886 there are some interesting memoranda which I made that summer in the island of Cyprus, and which up to this time have never been published in their entirety. But since Mr. Phillips has brought up, in his interesting article on "Fertilization," on p. 285, March 15, the question as to queens mating more than once, I will call attention to a presentation of this subject which I made in 1894 before the Entomological Society of Washington, an epitome of which may be found in their published *Proceedings*, Vol. III., No. 3, p. 169, issued March 28, 1895. Incidentally I might mention that on p. 19 of my "Manual of Apiculture" (Bulletin No. 1, new series, Division of Entomology), I said, when treating of the queen of *Apis mellifera:* "*Ordinarily she mates but once.*" This was first published in 1895, and I quite expected that some critic would call me to account for it—perhaps even sharply. Yet three editions of this work have been published by the U. S. Department of Agriculture — 24,000 copies all together — besides the editions of the Japanese and Russian translations, as well as portions that were translated into Spanish, French, etc., and, so far as I am aware, no person has taken exception to this statement regarding the queen. I was ready at any time to back it up by a statement of the facts contained hereinafter.

The following is the reference to my paper which was made in the *Proceedings of the Entomological Society of Washington*, and also the discussion which followed:

In a paper entitled "Observations on the Mating of Queens of *Apis mellifica*," Mr. Frank Benton alluded to the great interest which ancient naturalists manifested in regard to reproduction among bees and the mystery surrounding the subject, and cited the views of Swammerdam, De Braw, Réaumur, Huber, and other noted investigators of bee life during the past century. He described experiments made by Réaumur and Huber to secure artificial fertilization of queens. This was followed by a brief statement of the facts as now known regarding the flights and mating of queens of various races of *Apis mellifica*, especial mention being made of the view universally accepted at this time that the queen mates but once during her life. In proof of the error of this view, Mr. Benton quoted from his note book for 1886 the records, unpublished as yet, of two queens bred by him in Cyprus which he had watched closely, and which mated the second time; and he also cited a record published in *Deutsche illustrierte Bienenzeitung* for August, 1893, by K. Befort, wherein it was stated that a certain queen had mated twice, the second time two days after the first. Mr Benton believed these three observations were made with sufficient accuracy to prove beyond doubt that queens do in some instances mate twice, notwithstanding the fact that for a half century or more the opposite view has been held.

The paper was discussed by Messrs. Riley, Benton, Gill Schwarz, and Pergande. Professor Riley stated that, with the bottle bee of the West Indies, two or three or even five eggs are enclosed in each cell, and that all but one of these must perish. Mr. Benton said that with *Melipona* all of the eggs are laid in cells which are sealed before the larvæ hatch; but in the hive bee the cells remain open even to the end of the feeding period, and the workers remove the superfluous eggs. Dr. Gill remarked upon Mr. Benton's ability to recognize individual queens, and asked whether he could explain how he did it. Mr. Benton replied that it was very hard to say. It is a question of general appearance, size, color, shape, actions, and other points combined to produce an individual. Mr. Schwarz asked whether there is a double mating among the ants. Mr. Pergande replied that the queens live several years, but nothing is known whether they mate more than once. In his belief a single mating suffices. Mr. Schwarz stated that, with the white ants, all observers agree that no one has ever seen a copulation. This must take place within the nests, and the queens are so long-lived that there must be several matings.

The bottle bee mentioned by Dr. Riley is doubtless one of the stingless *Meliponas*, numerous species of which are common in the West Indies and South America. I hardly think that it is the rule with any of these species that "two or three, or even five eggs are inclosed in each cell," but the case in which this would occur is probably under conditions similar to those in which we find queens of *Apis mellifera* depositing numerous eggs in a cell.

It will be of interest, I think, to transcribe from my note-book the memoranda regarding these queens. They are as follows:

CURIOUS RECORDS OF QUEENS.

LARNACA, CYPRUS, 1886.

(1) June 9 caged in a nucleus a queen; emerged June 2.
June 10 released.
June 20, mated.
June 22, mated again.
July 4, laying.
July 9, queen is putting 8 or 10 eggs in each cell of the center comb; none in side combs; even puts eggs in where there are larvæ.
July 12, bees are sealing brood which looks like drone brood.
July 24, finely marked workers emerging.

(2) June 2, emerged.
June 16, appears to have mated.
June 25, mated again.
July 5, laying.
July 12, bees sealing brood.
July 25, finely marked workers emerging.

The above are simply records made at the time. A word or two of explanation may, therefore, be appropriate.

I remember distinctly that these queens were watched from day to day, and their development and every thing which took place in the nuclei holding them was noted and remembered, so that I feel positive there was no error in the observations. When I wrote of a queen *that she had mated*, I positively saw her return to the hive with the drone appendages attached to her body. I knew that it was time for her to mate, and was on the lookout for it. After her mating I confidently expected to find, within 24 to 48 hours, that she had begun laying, as all conditions seemed favorable; and when this did not take place my surprise was great. I therefore stimulated these nuclei, since I wished by all means to have the queens ready at the earliest possible moment for shipment, and I remember distinctly that orders were waiting for them, therefore I was hastening the production of as many queens as possible in a short space of time. In the case of No. 1, numerous daily examinations were made after the first mating, so that the familiarity with this queen, and with what was going on in the nucleus, was quite the same as though it had been under continuous observation from daylight until dark, and it was positively *the same queen that mated ten days later*. The same may be said, also, of queen No. 2. I regarded these two cases as so remakable that it was my intention to publish some account of them. Many things intervened to prevent this, including my removal from Munich, Germany, to Carniola, Austria, and the establishment there of "The Carniolan Apiaries," and my final return, four years later, to this country.

The publication in Gravenhorst's *Deutsche illustrierte Bienenzeitung* for August. 1893, of the record made by Mr. Befort of the second mating of a queen in his apiary recalled to my mind the notes in my old book, and I presented the subject at a meeting of the Entomological Society of Washington, June 7, 1894. I have not at hand this moment the record published by the German journal mentioned above, but recollect that the account seemed clear enough to indicate that Mr. Befort had not been mistaken in his observations, although I confess that, if they had not been corroborated by my observations made seven years previously, I fear I should have looked upon them with some doubt. As it is, nothing could now shake my belief that queen-bees occasionally mate the second time.

U. S. Department of Agriculture,
Washington, D. C., March 24, 1904.

ACTUAL EYE-WITNESS PROOF THAT A QUEEN WAS FERTILIZED THREE TIMES.

On page 286, near bottom of first column, Mr. Phillips asks if any readers will have the patience to watch for evidences of two *impregnations* of the queen. I have noticed this evidence of two marriage-flights, but I did not know it was an unsettled question. Last summer I put into use a glass sided one-frame nucleus or observation hive. I fixed it in a window-screen in a storeroom or pantry adjoining the kitchen. Among the many little things investigated (some of which I do not find mentioned in the bee-books) were the economies of subsistence and reproduction.

A young queen on her twentieth day of age (she could not fly out sooner because of daily rains) came back to the hive with copulatory organs of full size protruding. She was immediately siezed, pushed, and buffeted by a large number of bees in what seemed an unfriendly manner. They were trying in two parties, pulling in opposite directions to extract the appendage. I then opened the hive, and with a blunt knife held the parts, when the tugging of the bees at her head and body brought relief. They then soothed and stroked her; but her actions showed she was nervous and had been pained. In an hour's time things had become largely normal. Then the queen, which still seemed somewhat excited, went out, and in about three minutes returned with the same kind of appendage, which, like the first, had fully penetrated. I had changed my position, and could now intercept her and prevent her from entering the hive. Without difficulty I caught her in my open hand—she seemed too much surprised to escape—and by firmly holding her at the thorax I drew out the protruding organ. She bit me on the thumb. An examination of both organs showed that they had been pressed empty. I released her at the entrance and she entered the hive, but seemed

dissatisfied and much wrought up. The bees drove her from the hive several times, but she persisted in reëntering. She could find no peace or refuge. Finally she flew away for the third time, and returned with the evidence of coition as before. I did not interfere, and it was some hours before the bees by tugging relieved the queen. She began to lay in the usual time, and workers hatched in due season.

I trust this may be of interest in connection with this matter. J. G. BAIER.

New Brunswick, N. J., March 22.

[These facts from direct and personal observation, from different (and I may say competent) eye witnesses, are very interesting and valuable. We should be glad to hear from others who may have any thing to offer on this question.

From the facts so far presented I take it that the second or third fertilizations take place before the queen begins to lay. Am I right?—ED.]

EGG-LAYING CAPACITY OF A GOOD QUEEN.

A Remarkable Frame of Brood; Holding a Swarm of Bees on the Bare Arm; how it Feels to have the Bees Clutching and Clawing on the Skin.

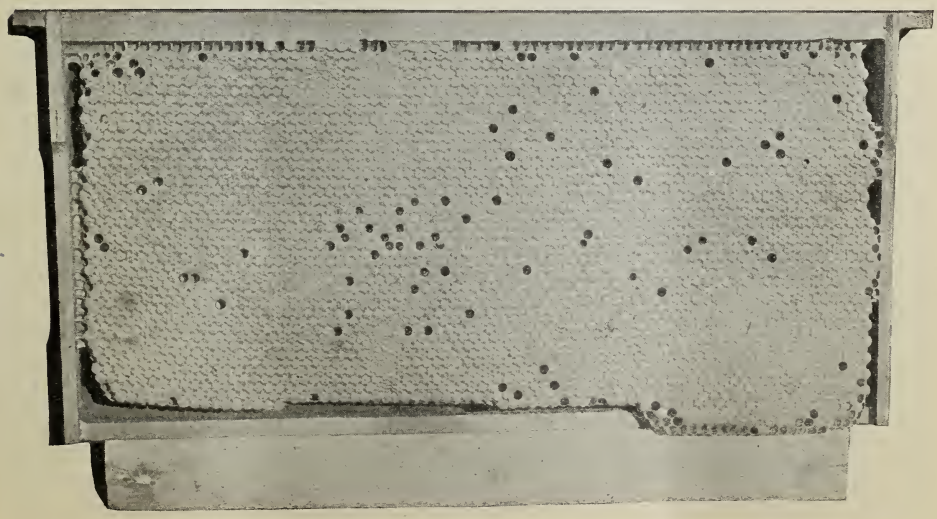
BY W. O. VICTOR.

While in conversation with Mr. Calvert last November, while he was in Texas, I mentioned several views that I have that I appreciate very much. He asked me if any of the bee-journals had had them, to which I had to say no. He said that I should write them up and send them to you; that I had been interested and benefited by the writings of others, and I should not keep my light under a bushel.

Now I am going to attempt to raise the bushel; and if we find but a charred wick I trust you will bear with me patiently while I attempt to bring forth a brighter light than we may at first find.

The first view I will present is a frame of brood from one of my apiaries of three-banded Italians which I call my imported-stock apiary. The mother of this brood was in her second year at the time this frame was photographed, and was in the very prime of life. I am sure she had not and never could lay better than she did at the time of depositing the eggs for this brood. If I made no mistake there were 21 cells in the entire comb that were partly filled with pollen. All other available cells were occupied by brood. As nearly as I could calculate, there were 8200 cells filled with brood in this frame. The most of the open cells had lost their occupants within a few minutes before the picture was made. By looking closely you can see several young bees crawling on the comb. These emerged from the cells while we were arranging the comb for the view. You can also see quite a number of cells with the cappings partly off, where the young bees are cutting out. Within two days more the comb was entirely empty and very light, as it was a new comb built on foundation. I would ask for a close examination of the outer edge of the comb, as you will see that all cells with walls on all sides were occupied by brood. Note that along the top-bar several cells are occupied that are built on the comb-guide, and protrude like drone brood in worker cells.

There is a history in connection with this view. I got a transient photographer to



A REMARKABLY WELL-FILLED FRAME OF BROOD FROM IMPORTED ITALIAN QUEEN.

make the negative for me, as I was not prepared at the time to do it myself. He made me a few prints from it I contracted with him to make quite a number for me, which I never got. Soon after this he went to the bay, rented a small boat, and went fishing. In a few days the boat was seen on the beach, but he has never been heard of, nor could my negative be found among his effects.

In regard to the number of bees that this frame produced at one hatch, a close calculation gives 8200, or about 2 lbs. of bees; and the brood was all hatched in about two days from the time the first hatched. This would indicate that the queen was laying at the rate of about ten and a half frames of brood in 21 days. Counting two pounds of bees to the frame would make 21 pounds in 21 days; and 60 pounds of bees in 60 days, or the average life of a bee.

Now, I do not claim that she kept up that rate of laying for 60 days, nor do I think I had 60 pounds of bees in that hive at any time; but I feel sure that Mr. Doolittle's high estimate of 4000 eggs in 24 hours was reached, and that they could have cast a swarm, had they swarmed, that would have broken the record mentioned in GLEANINGS for Jan. 15, page 82.

By the way, I have a picture of a swarm of bees that might have been a "record-breaker" in number of pounds, judging from their weight before I got them off my naked arm, and it is no doubt a record-breaker in some respects, in that I have never heard of a swarm of bees being photographed while on the naked arm of a man.

During the early spring I conceived a desire to have a large hive swarm, and catch the swarm on my naked arm, and photograph it, and for this purpose I selected six two-story hives that I allowed to become crowded to overflowing with bees. I prepared my camera for the work, and watched and waited for days for the swarm to issue. Finally I was rewarded by the swarm you see on my naked arm, in the picture, coming out just about noon, the best time of the day to do the work. I bared my arm to my shoulder, cast aside my hat, and proceeded to the bush where they were clustering. I soon found the queen, and caught her in my hand, and with the other hand I took bees from the cluster and placed them on my hand, where they soon discovered the queen and set up a call. I soon had them coming my way in great shape. I now opened my hand and let the queen go free with the bees; occasionally smoking, and shaking the bush to get the bees to leave it. Soon I had more bees trying to cluster on my arm than could, as their weight would break them loose. I finally got a twig with leaves on it and placed one end of it between my fingers, and I soon had my left wing completed, as you see. The white place near my elbow and at the point of my shoulder were the only places not fully fledged.

Although I practically had bees all over

W. O. VICTOR HOLDING A BIG SWARM OF BEES ON THE BARE ARM.

me (note the bees on my collar, and in my collar too if you could only see them), I did not get a single sting until I thought I had them all off, and straightened up, when, to my great surprise, one was under my suspender. I touched the button, and she did the rest. Although not a bee stung my arm, it felt as though thousands of pins were sticking it; and when I got the bees off it looked as if I had had it tightly wrapped with wire cloth from my shoulder to the ends of my fingers where the bees had been holding on; and for several days my arm had an itching, tingling sensation, caused by the bees pinching.

The non-swarming qualities of my bees delayed me in getting this picture until so late in the season that my enthusiasm had cooled in regard to it to such an extent that I neglected to use it up to this date as I had intended.

This picture is of my bees, myself, and my home apiary, taken by myself. See bulb in my right hand, and tube leading to camera. At my left is a stack of my famous four-barrel nuclei hives.

I have been reading Mr. Phillips' articles on queen-rearing, and am very much interested in them However, if I can get up nerve enough I may get down my "horse-brush" and try to smooth down some of his theoretical and scientific high places a little. Whoa, there, Mr. Phillips! don't kick too soon; I have not touched you. I am only thinking about it.

Wharton, Texas, Jan. 23.

[While it seemed to be unfortunate that the negative was lost, yet you are enabled through the half-tone process of engraving to make any number of duplicates.

This is a remarkably nice frame of brood. I have seen solid cards practically as good as this, but they were from the Holy Land stock, but never had any thing so full and nice from imported Italian queen, or, in fact, any pure Italian blood. I believe we shall have to award the queen that filled this comb with eggs the palm for breaking the record in egg laying. If any one can beat it, in Italian stock, let him send a photo of it or for ever hold his peace.

I have often wondered myself how it would feel to hold a swarm of bees on the bare arm. I have sometimes thought of trying it; but when I have had a good chance to test it, there would be three or four more swarms, and then I would be too busy to try the experiment to see how it would feel to have the bees hanging on by means of their tiny claws. I admire your nerve in standing there and holding those bees so long, and it must have hurt some or your arm would not have had such an itching and tingling sensation. I wonder if those claws also carried a slight quantity of the bee-sting poison.

Yes, friend V., we hope you will not keep your candle under a bushel so long again. Let us hear from you oftener, and especially when you can produce such remarkable photos.—Ed.]

REPORT OF NORTHERN MICHIGAN BEE-KEEPERS' CONVENTION.

Held at Traverse City, March 30 and 31.

BY A. I. ROOT.

The attendance, especially the first day, was not large; and at the very commencement of this report I wish to put emphasis on the importance of a proper convention notice. Tell first *where* it is to be; next, *when* it is to be, giving not only the day but the very *hour* on which the convention will be opened, and urge as many as possible to be on hand at the very opening. Last of all, tell at which hotel the bee-keepers are expected to stop. If it is a large city I would suggest not having it at the highest-priced hotel. Many of us are not in the habit of spending money in that way, and can not afford it. A. I. Root is one of that number—that is, my conscience rebukes me for putting up at the highest-priced hotels when there are thousands of places where money is so much needed — where a little money, for instance, will do a lot of good. I do not want an elaborate and expensive "spread." It is not good for my health, and there are thousands just like me. We should all put up at one hotel in order to be neighborly. The friendly visits among bee-keepers outside of the regular sessions are one of the very best features of a convention.

March 30, after I had my breakfast, I was on hand at the Montague Hall. The door was locked; nobody at the hotel knew any thing about a bee-keepers' convention, and the owner of the hall did not seem to know very much about it, only that it was engaged for that day. During the forenoon half a dozen bee-keepers came in, one after another. Nobody knew whether there was to be a forenoon session or not. Now, do not think I am reflecting on the good president. The melting snows, high water, and floods, at this particular time, had thrown all the railroads "out of whack." My own train that should have reached Traverse City between six and seven in the evening did not get there till between twelve and one. Small as the number was, however, we elected a chairman and held sessions. In fact, I do not know but I was a gainer by having a chance to become intimately acquainted with Mr. E. D. Townsend, of Remus, Michigan.

In the afternoon there were enough for a pretty fair attendance, and there were a few women present. Toward evening the president and secretary made their appearance, and we had quite a lively and profitable meeting during the evening.

One of the topics a good deal discussed referred more directly to Mr. Townsend, who seems to have largely inaugurated the plan of managing an out-apiary by visiting it only three or four times during the honey season. This idea is all the more interesting to us now when competent help is so

scarce and high-priced. Even away down in Cuba friend de Beche says he gets a larger per cent of profit on the capital invested where he employs a cheap native Cuban, at a low price, than where he manages an apiary with an expensive expert. Of course, the expert produces a larger crop of honey, and keeps things in handsomer shape than the low-priced man. This is especially true in Cuba, where extracted honey often nets the producer not much over two cents a pound. Another thing, the cheap man produces more wax than the high-priced one; and wax is worth almost as much in Cuba as it is here. Now, it would make a long reply if I were to go over the whole ground of managing an apiary profitably by seeing it only four times during the summer. Of course, this is for extracted honey. Swarming is to be prevented largely by giving the bees plenty of room; and this is done by having enough empty combs for the strongest colony to store all they can gather. When honey first begins to come in, give each colony an upper story with eight instead of ten empty combs. Mr. Townsend uses ten-frame hives for obvious reasons. Whenever this upper story is, say, half filled, give them another super with eight more combs. Of course, the eight combs are equally spaced in the ten-frame hive. This gives a chance to lengthen out the cells before capping it over. The extracting is all done at the end of the season, no extracting being done at all except at the last visit. If you wish to prevent swarming, be sure you give each colony enough combs to hold all the honey they may gather; for if they get every thing full they will be sure to swarm out. Better give them too much room than not quite enough. Put all the empty combs on top. The bees then will fill the combs and seal them up below before going into the combs above. The honey is all most *perfectly* ripened and capped over. In uncapping, cut down low enough to make your combs all as smooth as a planed board. Get rid of all hills and valleys on the surface of your extracting-combs. In this way you will get more wax than by just taking off the caps. But with perfectly smooth level combs the uncapper can do twice as much work; and where the bees are not allowed to build combs, they must indulge their wax-building propensity in some way. Let them use it by lengthening the cells and capping them over. Mr. Townsend gets from one to two cents a pound more for his extracted honey than that in the general market. I can readily believe this. Of course, you want to be sure that every colony has a queen. After that you do not need to see the queens at all from the beginning of the season till the close. There is so little swarming, where the bees always have plenty of room ahead of them, that no attention is paid to hiving swarms at all. I would suggest decoy hives. But friend Townsend says he can buy bees cheaper than to chase after what few swarms there may be hanging there. When asked if he did not have his apiary near a residence he said that in many respects he preferred the contrary. One of his apiaries is nearly a mile from his house, and has never been meddled with. This speaks well again for Northern Michigan.

Before leaving the matter of extracting I wish to mention an idea he gave us about uncapping. Tip the comb a little from you so that the cappings when sliced off will fall into the uncapping-tank by gravity. If you let them slide off the knife and lodge on the uncapped surface they will be harder to get off from the sticky honey than before you uncapped them. With combs always as straight as a marble slab an expert uncapper will slice off the caps at a single stroke. Mr. T. does not use an uncapping-can. A keg or half barrel stands over a good-sized tub, being supported by two narrow bars of wood dropped a little below the rim of the tub. This is so no honey can go over on the floor. The operating strips are narrow so the caps will not be piling up on them. The droppings drop into the keg, and drain off into the tub below.

There was considerable discussion about getting the honey that drips from the cappings so as to get all of it, and not have it injured in the process. Of course, melting the cappings by the use of the solar extractor or otherwise will get the honey; but the heat will injure it in color and flavor. I think one of the women suggested that, if the cappings were put into a cheese-cloth bag, and hung up back of the stove, where it is *almost* warm enough to melt the wax, you will get nearly all the honey, and have it unharmed.

You will notice, friends, that the most the manager has to do in these three first visits is to put empty comb on the hives that need it. Father Langstroth said years ago that a good stock of empty combs was the sheet-anchor of bee-keeping. The question might come up, "Where shall we get our stock of empty combs?" Perhaps they can be built up in the home apiary.

Our old friend Covyou, who was present, showed us an excellent plan for wiring frames on slender wire nails driven in the frames and bent over in hook shape. By his plan there are two horizontal wires, one a little above the bottom-bar and the other a little below the top-bar, then there were two diagonal wires. This braces and supports the frame, and is put in very quickly.

Mr. Townsend winters his bees in Northern Michigan on a plan that commends itself very much to me at least. In the porous sandy soil he makes a V-shaped trench. Rails or other suitable sticks are laid crosswise of the trench. The hives of bees, with sufficient stores, no top or bottom boards, are placed on these rails. All the dead bees and other trash drop down between the rails at the bottom of the trench, there being no bottom in the hives. The bees have most perfect ventilation. Trash or

boards are put over the trench, resting on rails laid on top of the hives. Then straw is put on, or other trash, and the bees are buried exactly as they bury potatoes in that region. A little ventilation is allowed through the trench; and under the snows of Northern Michigan the bees winter perfectly. Even during this past severe winter, the vegetation in the woods and in my ravine garden shows every evidence of not being frosted at all. I dug half a bushel of nice potatoes while cultivating around my peach-trees, and they were just as good as they were last fall. Many of them were not more than an inch below the surface of the ground. They never felt 28 below zero at all. In such a locality it is a simple thing to fix the bees so they will be perfectly safe from the time the snow falls until it goes off in the spring.

WORKING OUT-APIARIES FOR COMB HONEY WITH ONLY FEW VISITS.

Friend Townsend has not tested this plan as much for comb honey as for extracted; but he thinks it can be managed. It will take about one visit a week to look after the production of comb honey properly; and as the comb honey season does not usually last more than six or seven weeks he thinks about double the number of visits will be required. One man without any help, excepting when you come to extract, ought to be able to care for four apiaries of 100 colonies each, situated say six or eight miles apart. If I remember correctly, putting up bees for winter and taking them out of the pit in spring is a separate matter.

At one time during the convention I arose and asked the president if I could be granted the privilege of interrupting the proceedings of the convention for about five minutes. He said that, although such a request might generally be out of order, he thought (under the circumstances) the convention would grant it. Then, pointing out of the open window, I begged to ask if the winged crafts scattered over Traverse Bay, and flitting from side to side and from end to end like seagulls, were ice-boats or flying-machines. A big laugh ensued, and the friends assured me that they were ice-boats; and after the convention adjourned I was promised an ice boat ride. But man proposes and God disposes. When the convention was over it was raining, and I did not have my ride. On Monday, April 4, however, as there had been a brisk freeze the night before, the ice-boats were flitting again; and it was my privilege for the first time in my life to handle an ice-boat. I was going to say they went like the wind; but that is not half of it. They go *faster* than the wind. Why, when we looked out of the window that day during the convention they would go from one side of the bay to the other, up and down, and everywhere. It seemed to me like a glimpse from the Arabian Nights. An ordinary sail-boat, even under the influence of a good wind, or even a gasoline-launch, makes slow progress when seen two or three miles out on the water; but these things just skimmed and flew. When I took my ride there was hardly wind enough; but it was about the most exhilarating sport I ever experienced, to see the craft mind the slightest pressure on the rudder. Unlike the automobile, there is scarcely a sound or a jar. I have heard tell ever since my boyhood about "greased lightning;" and this seemed to express it more than any thing else. I then found that, with practice, you can go in any direction, no matter which way the wind blows, and one way almost as well as another. Besides, the thing is not at all expensive. The one I rode in cost only about $30, canvas and all; and the little ones, to carry only one person, can be made for less than half that.

In my next I will tell you of some of the inconveniences in that land of snow and ice during winter as well as some of the grand things, and also a little more about the convention.

BACILLUS ALVEI VS. BACILLUS MESENTERICUS.

Why the Two Can Not be the Same.

BY ADRIAN GETAZ.

I can not yet accept the conclusion of Dr. Lambotte, p. 1012, 1902, concerning the identity of *Bacillus alvei* and *Bacillus mesentericus vulgaris*. His arguments, briefly stated, are the following:

1. The two bacilli are apparently of the same size, shape, etc., when seen under the microscope.

2. Their development in cultures is similar, both producing a gluelike substance similar to the one found in foul-broody colonies.

3. Their sensitiveness to specific serums is the same.

The points above certainly look conclusive; and unless positive proof to the contrary is given, the identity of the two bacilli should be accepted. Still, they may be different things after all. Bacilli are very minute objects. Only their general features can be seen under the strongest microscopes. It is almost like looking at a group of men at a distance of a quarter of a mile. The differences between them might escape the observer.

The gluelike substance observed may not be the same in both cases; but even if it were, it would not be impossible that two different kinds of bacilli could produce the same substance.

Let us now take up the discrepancies. According to Dr. Lambotte's theory, the spores of *Bacillus mesentericus* are everywhere present in the atmosphere, but they have no action on sound colonies, while, on the other hand, they produce foul brood in unhealthy colonies. That is very near Mr. McEvoy's position.

But if that were true it would necessarily follow that sound colonies would never con-

tract the disease, while unhealthy ones would contract it everywhere and at any time. The facts show an entirely different state of affairs. When foul brood exists in a locality, sound colonies catch it just as well as the others; and, on the other hand, there are plenty of unhealthy colonies in many places that do not contract foul brood, undoubtedly because the germs are not there. This seems to me conclusive against Mr. Lambotte's theory.

A second objection is the difference in vitality of the spores. The *Bacillus mesentericus* spores (if I understand Dr. Lambotte correctly) resist for years all exterior influences. According to the experiments of Watson, Cheshire, and recently of Dr. Howard, the spores of *Bacillus alvei*, while very resistant against chemical agents and pretty high temperature, lose their vitality in two or three days when exposed to the dry open air or the sunlight. A strong proof of the correctness of their opinion is furnished by the success of the McEvoy method of curing foul brood. After eliminating any possible contamination through the agency of the honey, the malady can be cured in a few days, even without disinfecting the hive. This shows conclusively that, during these few days, the spores that undoubtedly have been in the atmosphere and on the walls of the hive, and probably the bees themselves, have lost their vitality; otherwise the disease would certainly break out again.

A third discrepancy is shown in Dr. Lambotte's experiments in trying to inoculate the disease. He applied a culture of *Bacillus mesentericus* to some healthy brood. The bees cleaned out brood and culture at once.

I have had no personal experience with foul brood; but from what I have read on the subject I feel sure that an application of foul-broody brood on sound brood would have developed a raging case of foul brood. Furthermore, it is known that the bees can not and do not clean out foul brood (see the Dec. 15th issue, 1902, pages 1016, 1017).

His second series of experiments is objectionable also. Only a fifth of the larvæ became diseased with a malady similar, at least, to foul brood. The others were cleaned out. Moreover, the process he used has no counterpart in the circumstances obtaining in the actual colonies.

I do not say now that Dr. Lambotte is in error; but the objections I have mentioned should be seriously investigated. His experiments do not seem to have been conducted very judiciously. His first laboratory experiments seem to have convinced him that *Bacillus mesentericus* and *Bacillus alvei* are the same bacillus, and that he tried to force his actual experiments with bees in that direction.

In trying to inoculate healthy brood with the disease it seems to me that the experiments should have been conducted simultaneously with *Bacillus mesentericus* from suitable cultures, and with *Bacillus alvei* from actually diseased colonies, perhaps adding, also, a third series inoculated with cultures of *Bacillus alvei*.

I think it was a mistake to kill the larvæ to be inoculated. We have no proof that the already dead brood contracts the disease, though it is likely to do so. But in the usual course of events it is the living brood that "gets sick."

Again, the disease is nearly always (if not always) transmitted through honey containing spores. It seems to me, therefore, that this mode of transmission should be the one experimented upon — that is, cause some honey to be infected with *Bacillus mesentericus* spores, and feed it to the colony experimented upon, to see if actual foul brood would develop.

Knoxville, Tenn.

[The conclusions of Dr. Lambotte are not, if I am correct, generally credited by those bacteriologists who have given the matter any serious attention. Facts from practical every-day experience, as you point out, disprove them in every important particular.—ED.]

FORMALDEHYDE GAS AS A DISINFECTANT.

Its Properties and How it Should be Applied; its Repeated and Long-continued Application Essential.

BY J. R. HAGAN.

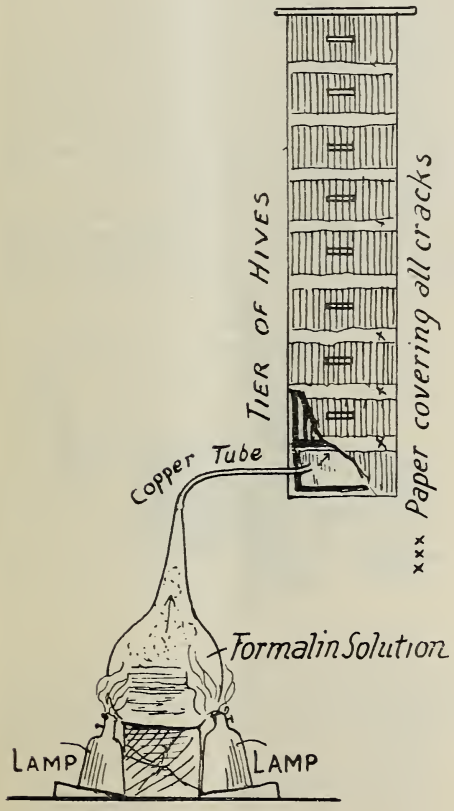
"Formaldehyde gas is a complex, unstable body, and failure in its use as a disinfecting agent results from an imperfect knowledge of its properties, its limitations, and its methods of production" (Resenau). Commercial formalin is a solution of water and wood alcohol, containing 40 per cent of formaldehyde gas, the wood alcohol being added to make it more stable. It being an unstable body, and subject to evaporation, it seldom contains the full 40 per cent, even when it is put up with the greatest care.

Formaldehyde gas is of about the same specific gravity as air at ordinary temperatures, thus making it necessary to generate it as fast as possible, and in large quantities, so as to expel the air and cause the gas to reach every part of the room or compartment to be disinfected. The gas must be brought in direct contact with the material to be sterilized; in fact, it has its power by uniting with nitrogenous organic and decomposing matter, turning them in o new chemical compounds which are sterile.

Surgeon-General Sternberg places this gas next to fire as a disinfectant, but it is not considered an insecticide of any great value, for bedbugs, crickets, etc., can live almost indefinitely in the strongest fumes of the gas. Rabbits subjected to the fumes of the gas for a half hour show no ill effects, except irritation of the lungs and mucus surfaces, but may eventually die of pneumonia: therefore, when using it, care should be taken not to inhale its fumes.

Formaldehyde gas is now considered the best disinfectant known for destroying the germs of foul brood and other non spore-bearing bacteria. The spores bear the same relation to bacteria that seeds do to plants and trees, as they have a thick enveloping membrane which prevents the disinfectant from being easily applied. For this reason the fumes of the gas should be brought in direct contact with the germs in order to destroy them effectually.

In using formalin a long-neck copper retort is best for ordinary purposes. The flames should be applied on the sides of the retort rather than directly under it. so that, when the solution begins to heat, the steam will come in contact with the hot metal and



be converted into gas; for unless this is done the liquid is simply evaporated, leaving a white powder known commercially as paraform. For the same reason, all of the solution put in the retort should be used before the fire is withdrawn.

A 20 per-cent salt solution added to the formalin is a great advantage, as it raises the boiling-point several degrees, and increases the production of the gas. The addition of 1 per cent of glycerine will improve the solution, as it will help to keep the paraform in contact with the combs being disinfected.

It should be borne in mind that, to disinfect thoroughly any thing as thick as combs filled with honey and bees, it will take at least 48 hours' exposure to the fumes of the gas to kill all the germs. It is still safer to repeat the application in a few days. In all cases it is better to apply the disinfectant in a warm room, as cold has a tendency to retard the evolution of the gas.

Washington, D. C., Feb. 23.

[Do I understand you to say that the germ of foul brood is "non-spore bearing"? I can hardly think it possible that you meant that. Your instruction on the use of the gas is valuable.—Ed.]

WHY CUBAN HONEY COMES IN WINTER.

Something about the Climate and Honey Flora.

BY HARRY HOWE.

Dr. Miller asks why the Cuban honey-flow is in winter I will try to offer an explanation. Here in the torrid zone there is no true winter, but spring and fall seem to lap over one another. However, there is usually about a month of weather too cold for honey secretion. December corresponds with September in many ways; so what seems to the doctor to be getting honey in winter is, to us, getting honey in fall.

There are flowers here all the time, but not all are of value for honey. Some locations have more at one time of the year, and others at other times. As the bell-flower honey is considered the best, the bee-keepers have been in the habit of looking for locations having an abundance of that, and so it has come about that most of the Americans are in locations where the principal honey-flow is in the fall.

Here, although things are green and growing all the time, there are few trees or plants that are true evergreens. Nearly all have their period of rest, when they drop their leaves, and are, for a shorter or longer period, as bare as trees in winter in the North. But they don't all do it at once, so the larger part of the trees that one sees at any one time have leaves.

Some bloom before beginning the season's growth, like the peach; and others, like the basswood, bloom at the close of the growing season; so here we have two flows, from the fruit and forest trees, but they lap over like the seasons. Other plants, like the morning-glories, bloom during all their growth.

This brings up another point of the seasons here. During the summer there is usually much rain, and during the winter it sometimes does not rain for months. Plants like the morning-glories grow and bloom until the drouth checks the growth, and then die. Others, like the bell-flower, are perennial, but stop growing during the dry season.

All plants secrete honey more profusely when there is plenty of moisture in the soil and in the air. Here the plants that bloom during the rainy season give a more abundant flow than those that come in dry times. But the honey gathered in the rainy season is very inferior in quality, and ferments upon the slightest provocation, while that of the dry season is of good body, and keeps well. The summer honey is also usually of poor flavor and color. These reasons have led the bee-keepers to look for fall and winter locations. During the rainy season, when every thing in dripping moisture about all the time, it is not possible to get honey properly ripened; and, also, the rain prevents the bees from working much of the time. Of course, the ideal location here would have honey all the year round; but such places are not easily found. There are very few places where one can extract for six months of the year.

Paso Real, Feb. 17.

CUTTING CANDIED HONEY WITH A WIRE; HOW THE PLAN SUCCEEDED IN THE HANDS OF ONE OF OUR SUBSCRIBERS; PUTTING FOUNDATION INTO SECTIONS SO THAT IT WILL NOT KINK, WARP, OR BUCKLE.

Just about three months ago I was taking some candied honey out of our uncapping-can, placing it on the stove until loose, then proceeded to cut it into chunks, when the thought struck me, and I made mention to my son that, with an electric wire, we might be able to cut our candied honey into a shape to handle. A few months later we noticed in GLEANINGS the success of Mr. Warren in cutting the honey with a fish-line or wire. We immediately set to work, and in a short time we were successful in cutting 45 2-lb. blocks and 18 ½-lb. out of a 60-pound can, leaving 4 lbs. of odds and ends; and, as you say, the honey sells all right. My son was so enthused that he proposed we make a cut of our machine and send it in for GLEANINGS; but I said we'd better wait a while, as some one would likely have something more perfect. On receiving March 15th GLEANINGS I ran over the contents, and there it was. Yes, it is what we want, and what we need in this land of solid honey.

Now, there is one thing more, at least, that we want more light on, and that is, putting full sheets of foundation into sections in a way so they will not warp, kink, nor buckle when placed in the super. As we have been successful with a few thousand the past season, and as it is mentioned on page 634, 1903, that it has not been practical to fasten foundation to the end as well as top, for the benefit of those wishing to produce the most perfectly filled sections we will, in the near future, send a drawing and explanations how it is done.

G. J. YODER.

Meridian, Idaho, March 24.

[We should be pleased to receive the drawing and description referred to.—ED.]

A SIMPLE AND EFFECTIVE METHOD OF GETTING ALL THE WAX OUT OF OLD COMBS.

I have read all you have published about wax and wax-presses, etc. I have rendered several hundred pounds in the last two years, and my way of separating wax from the original combs is very inexpensive, to say the least. I see some make the claim that the majority get only about 50 per cent of the wax. Now, if I thought I was leaving 25 per cent in the slumgum I would buy a press. I have just rendered some wax; and if you are making experiments I should like to send you some slumgum from the batch I have just rendered.

Some two or more years ago some one told how he rendered wax. I forget now whether it was in GLEANINGS or elsewhere. He said he used a big kettle the same as some

use in making soap, and he took an iron pail, holding about two gallons, and punched it full of holes and nailed a three-foot handle on it, and used that to push around

in the hot wax; and as the wax runs in the pail through the holes he skimmed it off with a common dipper. That is the way I get my wax.

A. L. DUPRAY.

Camanche, Iowa, Feb. 16.

[We asked Mr. D. to send us by mail a small sample of the slumgum, which he did. We put it to the test, and found that *all* the

wax was removed. This speaks well for the method here described. A plan similar in principle is to put the old combs in a bag, and then in a boiler of hot water, where it is weighted down. After it has "cooked" it is punched and punched repeatedly with a stick. As fast as the wax rises to the surface it is dipped off. When no more rises after the punching, the work is done. Any one who can't get more than 50 or 75 per cent of the wax must be a very careless operator.—Ed.]

TO SPREAD BROOD WITHOUT THE USUAL ATTENDANT DANGER.

The time of year is now coming on when a good many bee-keepers will begin to their sorrow to spread their brood, and in other ways try to force their colonies.

I wish to suggest a simple way by which this may be done without the loss so often attending the operation. This is by simply changing ends with one frame of brood out of three, the middle one of course; or, if a very strong colony, two out of five. By this means the honey in one end of the frame is removed by the bees, and eggs laid by the queen in its place, and in a few days the same thing is done on the two outside frames of brood; or, again, outside of the brood cluster may usually be found a frame of honey with the side nearest the bees filled with pollen. Reverse this, bringing the honey close to the patch of brood. This plan answers two purposes — stimulative feeding, in that the bees themselves remove the honey from close to the brood, and also stimulates the queen to lay in the whole sheet of comb rather than in small patches in several combs.

I have found it better, at this time of the year, where colonies are weak, and have two or three combs with small patches of brood, to remove the two outside combs and give them to a stronger colony, and, later, return them whole frames of hatching brood. H. Fitz Hart.

Wetumpka, Ala., March 1.

A KINK IN CLEANING BEES OFF FROM EXTRACTING-COMBS.

I will give you what I call a valuable kink in cleaning off the bees from extracting-combs. It may be old, but I haven't seen it in print. I go to the hive, take out two combs, set them down, then I move over the next one so I can get at each side with a Coggshall brush. I smoke a little, and rub the sides of the comb with the brush. The bees will tumble off and disappear in the lower part of the hive. Take out this comb, do the next the same, until all are cleaned off and taken out. Take out as fast as cleaned off. Then put the two combs first taken out back in, and brush. The combs in a ten-frame hive can be cleaned in two minutes, and not a bee outside of the hive to crawl round — no queen lost, or robbers to bother. Before I adopted this method, when I shook them off sometimes they would come back with a vengeance; besides, the grass is full of bees for some time. The new way, the bees seem to be so much surprised that hardly one will take wing. W. D. Soper.

Jackson, Mich.

[I believe your plan to be good. It is worth the trying. It is very annoying to have the bees in the grass, and possibly under foot, and crawling up pants.—Ed.]

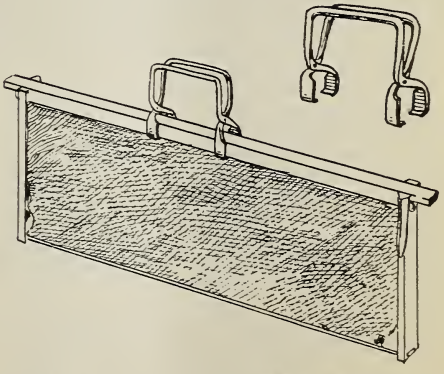
SHALLOW HIVES; HOW THE USER OF THEM MAY HAVE THE ADVANTAGE OVER HIS FELLOW BEE KEEPER WHO DOES NOT USE THEM.

Since my article appeared, March 15, I have received several letters inquiring about this high-pressure comb honey-production system There seems to be a demand among honey-producers, especially those in rather poor locations, for a system of very shallow frames and divisible brood-chambers that will enable them to produce comb honey where now they are compelled to extract. By this system I have been able to produce paying crops of comb honey right along when my neighbors with deep frames have been compelled to quit producing comb honey. Any one can produce extracted honey; but it takes an expert to produce comb honey here; but if he can do it he has the market all right. J. E. Hand.

Birmingham, Ohio, Mar. 29.

FRAME-TONGS FOR "SHOOK" SWARMS.

I send a description of a little tool which I think will be found a great convenience to most bee-keepers. I call it a brood-frame tong. The cut shows plainly how it is made; but the reader will have to get his



blacksmith to make it unless he is fortunate enough to have a forge of his own. It is made of two pieces of ⅜-inch steel or iron rod, each about 12 inches long, and bent as shown in cut about four inches from each end. The jaws should be long enough to reach to the bottom of the top bar, and the tips should be bent in a trifle so as to go under the top-bar just enough to prevent its slipping out. The parts are made just

alike, and put together with rivets in the form of a double-jawed tongs as shown in the cut. In taking the frame out of the hive the top-bar is grasped in the center with the tongs with one hand, leaving the other hand free to use the knife or other tool to pry the frames apart; and if the bees are to be brushed off, the frame is easily held and turned from side to side with one hand while the other is free to use the brush to the best advantage. In shaking bees for "shook" swarms, etc., two of them could be used to advantage, one in each hand at each end of the top bar. They would afford such a strong grip that the most vigorous shaking could be given without fear of losing hold of the frame. I think the use of this little device would greatly lessen the number of stings received, and would be especially desirable to beginners on that account, as it would almost entirely obviate the necessity of taking hold of the top bar (which is often pretty well covered with bees) directly with the fingers.

E. S. WEBSTER.

Hutchinson, Kans., Feb. 16.

[Something similar was sold like this by Thos. G. Newman, then of Chicago, many years ago. Instead of two jaws there was only one. Personally I have never believed these tongs were worth much to the practical bee-keeper; but I can see how those you describe *might* (I don't know) be very serviceable in shaking swarms. I should like to get reports.—ED.]

HONEY FROM PINE NEEDLES.

In reading Prof. Cook's article on vegetable physiology, p. 281, in which he speaks of "great drops of delicious honey dew" on the pine foliage in the Yosemite region, I was reminded of a similar incident I once witnessed in Northern Michigan. It was in October, after severe frosts had killed all the flowers, and bees had quit work for the season. One pleasant morning I was surprised to find my bees as busy, and coming in as heavily laden as in the midst of a rich basswood flow. Of course, I was greatly surprised; but on reflection I said to myself, "Some one has cut a bee-tree in the woods near by, and the bees are gathering the waste honey." For two days the work went on, hundreds of bees dropping in front of their hives from weariness, and so heavily loaded it was difficult for them to rise.

The third morning they went to work as vigorously as before. I was then satisfied it was not waste honey they were gathering, and started out to investigate. It was easy to follow up their line, as they all went in one direction, and kept up a constant roar over my head. Going about a fourth of a mile I came to a grove of young white pines from five to twenty feet high, and the mystery was solved. There on the ends of numberless pine needles hung drops of nectar, glistening in the sunlight, clear as crystal, and sweet as honey. A bee had but to alight on one of the needles, fill its honey-sac, and depart, leaving enough to supply its successor.

In taste the nectar was deliciously sweet and pleasant. It seemed to be perfectly transparent, and must have made excellent honey.

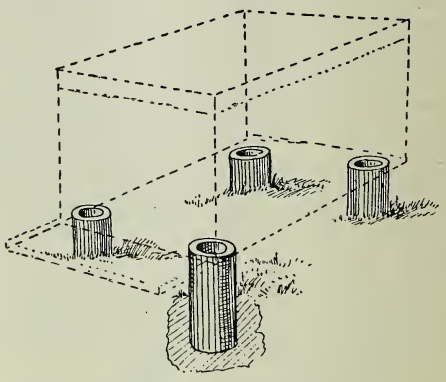
I kept bees for twenty years in the pine regions, but this was the only time I ever knew honey to be gathered from pine needles.

D. C. LEACH.

Springfield, Mo.

A DRAIN-TILE HIVE-STAND.

The time will soon come when hive-stands will be needed, and I want to tell about a stand that is cheap, and will not rot—one that will hold up your hive square and nice—no place for mice or moles to work; one that will not throw your hives out of level; easy to mow around; takes little space, and



will last for years, and keep always in shape. It is nothing more nor less than a good smooth 12 inch drain tile, set three or four inches in the ground, leveled up, and dirt well packed around the tile. An eight-frame hive stands on it snugly and safely, and you can easily turn your gum around if you so desire. A thin board to lean up in front for an alighting-board, and the thing is complete. It is the cheapest, tidiest, and most durable hive-stand ever yet introduced.

J. W. C. GRAY.

Atwood, Ill., Mar. 8.

[Wouldn't bricks set on end in the ground be just as good and cheaper?—ED.]

THE SALISBURY HOUSE APIARY NOT A FAILURE AFTER ALL.

On page 232 I notice you are going to drop the Salisbury house-apiary from the A B C book. Now, don't you do it. The house apiary was all right, or nearly so. All it lacked was proper management; that is, a system suited to it and the bees. Four years ago I built a Salisbury house-apiary at an out-yard for extracted honey, and it was so much a success that two years later I built another for comb honey, which has been equally successful. I have a cellar

under the last one that winters perfectly. I have produced tons of honey in these house-apiaries. If you come up in this part of the State, I shall be glad to have you come and see these houses in operation, and will give you the management whereby I have been able to succeed. I have three apiaries containing 250 colonies. FRED H. LOUCKS.

Lowville, N. Y., Mar. 26.

[I did drop the Salisbury house-apiary, but if I had received your letter sooner I would have kept it in. I shall be pleased to look yours over if I am in your vicinity. —ED.]

THAT BOARDMAN HONEY THAT CANDIED.

I note what you say on page 120, "the Boardman honey candying at last." I was much surprised, I assure you, and went at once to examine some samples of several dozen jelly-tumblers from which the one you have had exposed on the window-sill was taken, which you say was grained solid. I am pleased to say I found them as I expected — in perfect condition, without the least perceptible change, and they have been subjected to a severe test in a winter temperature for two winters — a test which I had thought entirely satisfactory for all practical purposes.

But how shall we account for this sample which you have reported acting so radically different from the rest? It acts like a different honey; and are you quite sure that some meddler has not been helping you, and has been tampering with the sample on the window-sill? I should be pleased to have you investigate further, and report.

East Townsend, O. H. R. BOARDMAN.

[I am positive it is the same honey. It has not been touched by any one but myself.—ED.]

TRANSFERRING FROM OLD BOX HIVES WITH FAST BOTTOMS.

I can buy ten or twelve colonies of bees in box hives. The boxes are made with bottoms nailed fast, and up in the hive a few inches. How would you transfer from such hives? and at what time in the spring would you do it?

I understand how you would do it if that bottom was not there; but you can not get the bottom out without tearing the hive all to pieces. In that way, would it be better to use what comb and brood I could, or would it be better to get bees out and put them on frames with full sheets of foundation? B. S. ADKINS.

Huntington, W. Va., Feb. 26.

[I would suggest that you blow quite a quantity of smoke into the entrances of these hives, enough to subdue the bees thoroughly; then with a cold chisel and hammer pry the bottom off. I hardly think you would find it attached to the combs; and, even if they are, a long-bladed knife will sever them. After removing the bottom, put a box or another hive on top of the old hive, now inverted, with bottom off; drum on the sides until the bees go up into the box on top. Now tear the hives apart; cut out the brood-combs and insert them into the regular frames of the new hive. I would use nothing but good cards of comb. The pieces had better be melted up, except where they contain brood. These can be fitted into the brood frames and secured in position by winding string (the ordinary grocer's twine) around the frames, and tying. The ordinary sticks and transferring clasps I would not use. Strings are far better, because the bees will gnaw them off if you should forget to do it later on.

I would use full sheets of foundation next to the combs of brood. It would pay you not to use any of the old empty comb unless it contained brood. Natural-built comb is apt to contain drone comb, have irregular surfaces, and holes.—ED.]

CAN HIVES AND COMBS IN WHICH BEES HAVE DIED BE USED AGAIN?

My neighbor has 50 hives of honey in which the bees have died from exposure to the severe winter, being left on the stands. I can buy them cheap, but am uncertain what they are worth. What shall I do in order to feed them to my bees? They will most likely be candied, will they not? What can I do with them in that case?

MYRON PICKERING.

Nevins, Wis., Feb. 23.

[The hives from which the bees have died can be used by you this coming spring. We would not advise you to weaken your present colonies by dividing until settled warm weather comes on. Then shake a few bees with a queen on to the combs in which bees have died. If it is warm weather the bees will clean things up cheaper than you can.—ED.]

ADULTERATED HONEY THAT DIDN'T SELL A SECOND TIME TO A CUSTOMER.

On page 187 you ask for reports from different localities about bogus honey or glucose sold as honey. I know three grocers who tried adulterated honey in nice glass jars. They said it was very slow sale. They finally sold it at cost, and then handled my honey in bottles. I see a great many of them have corn syrup and honey drips, etc., in tin cans. Of course, they sell some; but I don't think many people will buy a second can. J. M. CUTTS.

Montgomery, Ala., Feb. 26.

[Yes, and the corn syrup will fail to sell after a time when consumers come to know its real character.—ED.]

SWEET CLOVER FOR CATTLE AND BEES.

I have twenty acres of the white sweet clover growing. It is all right for bees, and is good cattle pasture in early spring.

Onawa, Ia. S. R. FLETCHER.

But the Comforter, which is the Holy Ghost, whom the Father will send in my name, he shall teach you all things, and bring all things to your remembrance, whatsoever I have said unto you.—JOHN 14:26.

Quite a little remonstrance has come in from the dear friends who love GLEANINGS and God's holy word, because I intimated in the last issue that James might not have been inspired when he told us about healing the sick. A few have hastily decided that I meant to doubt the inspiration of James. What I did say was this:

I believe James is right; but I do not believe he had divine inspiration so that he knew about these things as did God the Father, or Jesus the Son later on.

Now, I simply doubted James' divine inspiration in regard to the matter of healing, because it was somewhat out of his line. As I said in the last issue, the Bible is not a doctor book, but its field is a spiritual one. Paul on one or more occasions intimated, you may remember, that he spoke of certain things without authority; or, if I understand it, it was his individual opinion, without the inspiration or insight that God had given him in spiritual things. Even Jesus himself says, Matt. 24:36, that there are certain things known only to the Father—that they are not revealed even to the angels in heaven. If this is true it would be nothing strange if many of the writers should speak occasionally in the Bible of things where they had not authority, but gave only their own individual opinions.

I give below a letter from a dear brother whom I visited in one of my wheel-rides in Missouri. You will notice in the outset that he rather takes me to task; but before he closes he seems to stand pretty nearly where I do in regard to this matter of divine healing. As his reasoning seems to be based on a careful reading of the Scriptures, I take pleasure in giving it here:

Mr. Root:—I read your Home talk in your Mar. 15th issue, and, though I am no minister, I must raise some objection to some of your teaching there; and that is, in regard to James not having full authority. I believe, and am fully convinced, that all the apostles' writings are to be considered and accepted as fully inspired, and to be God's word, and not man's, and that Jesus wants us to accept it as such; and to reject their teaching means to reject Christ's teaching—in part, at least. Christ said, "All power is given into me," meaning he had all authority, and can give that authority to whomsoever he will. Then he said, "Go teach" all peoples, etc., meaning he gave them the authority. At another place he told them, "Whosoever heareth you heareth me; and whoso despiseth you despiseth me." At another time he told them, "As my Father hath sent me, so send I you." Again, he says, "Ye shall sit on twelve thrones judging the twelve tribes of Israel," meaning that they shall teach forth the word of God that will be the judge of all people. Again, "Ye shall be my witnesses to the uttermost parts of the earth." So they were to be his representatives, and Jesus was their authority and backing. Again, "I will send you the Comforter, who shall bring all things into remembrance that I have told you, and he shall lead you into all truth" This takes in all, and no question; but all the apostles' writings are truth and nothing but truth, and perfectly in harmony with Jesus' teachings and will.

In regard to the subject you wrote on (health), etc., I will briefly give you some of my opinion, or, better, say faith in it; and if it will give you any light on it, all right; and if not I hope there can be no harm done.

I, too, have studied that subject considerably, and am much interested in it. I believe Christ did not teach health and health hints, mainly for the reason that his work was still far more important than teaching bodily health; and he had all he could do in teaching moral and spiritual principles; but he left something on this subject for us through his apostles who were still to carry his work further, and complete what he had begun.

In regard to healers, in the times of the apostles there were those who had the gift of healing; but that this should continue to be so I doubt very much; and the scripture you quote as a text proves it. If it had been intended that all through the ages there should be those who had the gift of healing by the Holy Spirit, no doubt James would have said that, if any were sick, they should call the healers to heal them. We also see that Paul left a certain friend at one place sick, seeming that he had either lost some of his power to heal or else could not heal every one. Again, Paul tell Timothy not to drink too much water or not just water (as the German makes it), but use a little wine for his stomach's sake, showing, first, that he did not heal Timothy, and, second, that it is right and needful for man to do what he can that will be conducive to his health. He did not say Timothy should pray for his health or call for the elders to pray; so we learn by taking all these scriptures into consideration that man should use what remedies and physicians he thinks best for restoring his health; and I think James means, in addition to this, if the sickness prove stubborn, and nothing seems to help, as is sometimes the case, then his advice and counsel is to call for the elders of the church to have them pray over him; and then, if it be God's will, the sick will be restored; or we might say the elders will get faith to believe God will heal when God's will is to heal. This is God honoring, and I believe it should not be neglected as it is.

I have seen on several occasions—once with my mother and once with my wife—where this was done, and the sick got along very well yet using remedies, and in the one case using surgeons, but first asking God to direct and help.

In regard to the applying of oil, I am not so sure about that. Your teaching on that may be right. However, I have rather thought it might be that it should be applied only as an emblem of help from God.

I will say that all the healers I ever heard of were imposters or deceivers, and not true Christians; and that this deceiving doctrine of divine healing has taken considerable hold on some of our people, and I am anxious that it be rooted out. But this to call for elders to pray over the sick is entirely different, and shows faith in God.

I am glad your wife could be spared to you. It seems that sickness comes sometimes just for a lesson to us. P. HOSTETLER.

East Lynne, Mo., March 23.

Another good brother takes me to task because we sent for a doctor at all. He says in substance that for many years God had been his only physician, and he is now very much healthier than when he used drugs and employed doctors. I do not doubt this at all. My humble opinion is that thousands of people would enjoy better health by a similar course. As he seems to be a very candied man, I wrote back to him something as follows:

Dear Brother:—It is, no doubt, your privilege to live—yes, to die—without a doctor if you choose; but if your dear wife were near death would you dare to carry the responsibility of letting her die without calling on the best physician you know?

I told him that, after the kind letter he had written me, I should be very glad to get his opinion in the matter. Here is his reply:

In regard to sending for a doctor when those near and dear to me were in danger, I don't think I would unless they insisted upon it. D. I. WAGAR.

Flat Rock, Mich.

But, dear brother, how about *helpless children* who are not old enough to have an opinion in regard to the matter? I tell you, friends, it is a serious thing to neglect the aid of a skilled up-to date physician.

Another writer suggests that if we had doctors who were God-fearing men, temperate, pure minded, and devoted Christians, we who are professors of religion and members of churches could more consistently think of calling in the aid of a physician. I have often thought of this. I have sometimes wondered whether we were not demanding too much of our family physician. We expect a minister of the gospel to be in every way a model of righteous and godly living; but when we become intimately acquainted with them we are pretty sure to find that even they are human. We may know a man for long years, and deem him almost a perfect sample of manhood; yet closer acquaintance, or a longer one, will, I was going to say invariably—perhaps I should say *almost* invariably—show that he has some peculiarities, or perhaps I might say that, under certain tests, he shows himself to be frail. Now, we hardly ever expect a physician to be up to the spiritual standard of the minister; but I do think he ought to come pretty near it.

Not very long ago I was a little vehement in declaring I would not patronize or avail myself of a certain man's services because he had a bad record: but the manager of our business looked me square in the eye and said, "Father, if you are going to carry out that rule you will block business, and deprive yourself of many great and good privileges. Again and again we need certain things done that are exceedingly important, not only to ourselves but to the world at large; and the only available man is the one whom you would call, and perhaps with justice, a bad man. What shall we do?"

I think it was Ernest who suggested here that we had better accept the good, or, in other words, put the man at work at some honest employment, forgetting or overlooking, for the time being, his past, or what may be at some time a bad record. In other words, it seems to behoove us to make the best of humanity as it lies before us—encourage the good and discourage the bad, at the same time praying for divine guidance and inspiration, remembering the words at the head of our text.

April 8.—I have just returned from the convention at Traverse City and a brief visit to the cabin in the woods. During my absence a great pile of letters have come to hand in regard to this matter of divine healing and Mrs. Root's recent sickness. Letters are on my desk from the advocates of every line of divine healing, from bright intelligent men and women; and my attention is called to many precious Bible promises that I had never before discovered or understood. I finally took all of these letters over home, and Mrs. Root and I went over them together. As each one was read we agreed that the writer must have some kind word of recognition; but as my time and strength are limited in this matter of correspondence, we finally decided that I should thank the friends who have thus written, here on these pages. Perhaps a little later I may make extracts from different letters. There is truth, without doubt, in all of them, and I believe we are all getting nearer together in this matter of treating disease. I hope physicians as well as their patients will all unite in asking God to guide us in the way of all truth, for then we certainly shall eventually come on the same ground or pretty nearly so. What a beautiful world this would be if *all* were *seekers* after truth and righteousness! One great point comes out strong and clear to me in all this correspondence: That the time is coming soon when this matter of "robbing sick people" by fraud and deceit will be, largely at least, done away with. There is wisdom enough in this age in which we live to do away with superstition, and with what is worse still, the downright *swindling* and *hypocrisy* in this matter of healing the human frame divine. A large number of the letters tell us of those who formerly put their faith in drugs, spending vast sums of money in going from one thing to another, like the woman mentioned in Mark 5:26, who "had spent all she had, and was nothing better but rather grew worse." There are many letters from such people, closing with the glad news that, after they put their faith in God, and had prayerfully searched for the laws of health, they found not only health but happiness too, without medicine of any kind. I am sure there is a great awakening just before us—an emancipation out of darkness into light; and it is coming through the gospel of Christ Jesus our Lord and Savior. I am begining to think the Bible is *considerable* of a "doctor book" after all, if we search it more carefully and take it right.

SOMETHING GOOD FROM THE MODERN FARMER AND BUSY BEE.

Not long ago I suggested that Mr. Abbott, editor of the above, sometimes lets his peculiar zeal and fighting qualities get started in the wrong direction. But now he is on the right track for sure, and we take pleasure in copying two of his recent editorials.

OUR STATE AND COUNTY FAIRS; DRIVING OUT LIQUOR-SELLERS, ETC.

"Our fair will be clean this year," is what the president of the Illinois State Fair Association writes to the *Breeders' Gazette*. Good! We are making progress: the fakir and the drunkard maker must go. Who will be next? It is an insult to the farmers to announce an agricultural show, and then fill up the grounds with saloons, fakirs, and all kinds of disgraceful semi-nude shows just as though he and his wife and children were capable of enjoying only the filthy debaucheries which characterize so many agricultural fairs. Good for Illinois! Missouri welcomes her into the ranks of the clean fair States. What State will be next to banish all this filthy and disgusting debauchery from its fairgrounds? Let the good work go on until there

is not a State in the Union that will dream of permitting any such thing to find entrance into its fair gates. The whisky advertisements and the fakir must go, as must also the saloon and the gamblers from the fairgrounds; and the sooner they go the better it will be for the rising generation.

WHISKY ADVERTISEMENTS IN THE HOME PAPERS.

We learned some time ago of a gentleman who protested against a prominent fruit-paper carrying whisky advertisements, and the publisher wrote him saying that he had known men to get rich by attending to their own business. Now, this is an old gag, but in this case it was very much out of place, for the man who wanted to place some legitimate business with this paper had a perfect right to offer his protest against being forced to put his advertisement in such company, and he was attending strictly to his own business when he let the fact be known that he did not countenance any such advertisements. It is true, a paper is private property; but it belongs to that class of property whose value is in proportion to the patronage it receives; and the people who patronize it have a right to demand that it be clean and decent in every department. Especially is this true of a paper which is taken into the privacy of the home, and is read by every member of the family. The head of the family who does not look closely to the character of the papers which are taken into his home, for his children to read, fails to attend properly to the most important business he has in hand, namely, the moral and spiritual development of those who have a right to look to him for proper guidance and protection in early life. We trust that the day is not far distant when people will not dare to write such a letter to a patron.

Temperance.

LOCAL OPTION IN CANADA—A CORRECTION.

DEAR MR. ROOT:—I was much surprised to read what you have to say about "local option" in temperance column, GLEANINGS, March 15. I am now in a position to speak of things as they are in Arizona; but as regards Canada your statement concerning majority required to enforce local option is erroneous. Mr. Calvert notwithstanding. In fact, we have municipalities quite near us under local option, some of which carried the act by only three or four majority. Possibly Mr. Calvert may have had in mind the referendum submitted to the electors of Ontario a year or so ago. In this it was stipulated that a certain percentage of the number of votes on the voters' list were required to be polled in order to enforce the act.

As regards 'Queen Victoria introducing such a regulation." I would say, friend Root, that no queen or king has really any thing to do with the framing of our laws, as we practically govern ourselves, even if we are not a republic. Just here I would say that we are anxiously awaiting developments in our local legislature, and are earnestly hoping that most stringent regulations will be put on the liquor traffic. The great majority of the electors of Ontario demand this, and are entitled to it, as, both times the question has been submitted to the people, the prohibitionists have won by a large majority.

By the way, Mr. Root, it is rather amusing to see how correspondents from this side of the line are always credited with "Canada" as their address. It is possible to travel in any one direction for hundreds of miles and be in "Ontario" all the time, not say any thing about Nova Scotia, British Columbia, Manetoba, etc. It would seem very vague, even to us Canucks, to speak of Mr. A. I. Root, Medina, United States.

Allow me to speak with appreciation of your Home department. Nearly all the bee journals come to our home, and GLEANINGS is one of them most eagarly looked for. J. L. BYER.

Markham, Ont., March 21.

Friend B., I am exceedingly obliged to you for setting us right. Before you close, however, you admit, if I am correct, that, although the *majority* in your country are in favor of local option, like your brethren in the United States, by some means or other you do not *get it*. We have just had a sweeping victory here in Ohio over the brewers and saloonists, on the matter of resident local option. The saloons of Ohio are all to be banished from neighborhoods where the majority of people want them banished.

Of course, we are exceedingly glad to know that we were mistaken about Canada; but how about that young sister of ours—Arizona? Is it only local, or is it the rule all over the State that it takes two temperance votes to offset the vote of one beer-drinker?

Tobacco Column.

TOBACCO FROM A BUSINESS STANDPOINT.

A large business firm in a western city wanted a young man for a special purpose. Sixteen applicants for the position were on hand at the appointed time. Among them was Mr. Gray Newark, whose parents live at Cadillac, Mich. The position was a good one, with a large salary; but their requirements were such that none but first-class men would probably apply for it. When young Newark saw the fifteen other stylishly and expensively dressed boys with patent-leather shoes, gold watches, etc., he felt a little diffident in regard to his plain and simple work-day suit, etc. When it came his turn to be interviewed, one of the first questions was, "Do you use tobacco in any shape or manner, and have you ever used it?"

The young man was able to reply that he had never used it at all, and never expected to. Of course, a good many might claim as much in order to deceive the questioner, and, perhaps, would form the purpose of breaking off then and there to get the position. Young Newark said, however, that his questioner kept his eye on him so keenly that he felt as if he would read him through and through, and decide whether he told the truth or not. Right here is a point I wish to emphasize for the boys. Many of you may have a mistaken notion that an untruth will pass current at such a critical moment; but I can say from many years of experience in hiring hands that a sharp up-to-date employer is seldom deceived in a young man. Sometimes in our business here an applicant comes before the members of our firm. Well, I have noticed frequently that, when some applicant attempts to deceive us, we all recognize by his talk and actions that he is untruthful. When we get hold of an honest boy or young man, his looks and actions, and the ring of his voice, tell almost unmistakably to all present that he is honest and straight. A man's character and habits are usually stamped more or less on his forehead. But let us go back to our young friend Newark.

The next question was something like this:

"If you have never used tobacco, proba-

bly you have in like manner abstained from all intoxicating liquors."

Of course, Mr. Newark could answer in the affirmative. After he had been with his employers about a year they wanted a man to travel to visit the leading drygoods stores of the United States. Of course, the first trip would be with an old hand. Then the firm addressed him something like this:

"Mr. Newark, when we send you out into the world among strangers you will be exposed to temptations you have not met here; and did we not believe you would carry yourself as straight away from home as you do here, we would not think of exposing you to such temptations. We believe, however, that your principles are so rooted and grounded that we shall incur no risk in giving you this position; otherwise we should not think of asking you to take it."

Once more this young man was promoted away ahead of his fellow-clerks, with a salary corresponding. He is to travel in Pullman cars, put up at high-priced hotels, etc.; but he is expected to carry his temperance principles along with him wherever he goes. Do you see the point, boys? Such a little thing as a decision in early life that he would have nothing to do with tobacco seems to have fixed his future. So far as I am informed, his employers did not ask him if he was a professing Christian or a member of the church; but my impressions would lead me to believe that the young man who has built up character on such a basis would, as a rule, seek to be allied with church people, an Endeavor Society, the Y. M. C. A., etc.

Now, boys, does it pay to learn to use tobacco when you know nothing about it? This drygoods firm I have mentioned is not particularly different from others that pay large salaries for first-class men throughout this whole wide world.

ELECTROPOISE, OXYDONOR, ETC.

There are still a few who urge that, so long as the above traps do good, why not let them alone? on the principle that, "where ignorance is bliss, 'tis folly to be wise." To all such, let me put it this way: A counterfeit ten-dollar bill may do good. It may pay honest debts, purchase needed food, clothes, etc. Then why not let it alone? *Because it is a counterfeit.* And in a like manner, Electropoise, Oxydonor, etc., are counterfeits. I am sure I have given sufficient proof of this. The venders put Electropoise out with the claim that it is a scientific apparatus. It is not scientific, and it is not an apparatus. Their claims are lies, just as much as is the claim of the man who says the counterfeit bill he manufactured is a good one. Am I not right?

THE INTERNAL WATER CURE.

Mr. A. I. Root:—As I have been benefited by your Health Notes, I feel impelled to contribute an idea that may be of help to others Having suffered all my life from congenital hernia I am constantly on the lookout for any thing that will relieve constipation. Your idea of a tube and a bucket of water was at once tried, and found to be a great help at times. I soon found, as you did, that I sometimes needed something to reach the higher bowel. Then I began experimenting with hot water, salt water, cold water, etc., without any benefit. Then I procured a longer tube and raised the bucket, and found at once I had just what I wanted. As it required more water I use a gallon bucket and a seven-foot tube. Fasten the tube to one ear of the bucket so it can't pull out, and place a cushion of several thicknesses of cloth on the edge of the bucket under the tube. There is an advantage in having the water a little more than blood warm Fill and empty the colon once or twice before expecting it to go higher, and at the third filling it will nearly always enter the higher bowel without any unpleasant pressure. This is, I think, much safer than to try to use a colon-tube. A. C. B.

Friend B., I omitted to state that I always use a tube about 6 feet long. I have often thought that, in stubborn cases, one 10 or 12 feet long might be an advantage, raising the bucket as high as the tube will allow it to go, in order to get more pressure. Many thanks for your contribution.

Special Notices by A. I. Root.

THAT FIFTEEN-ACRE FARM NEAR PHILADELPHIA.

We are getting material ready for a valuable write-up, and hope to have it ready for our next issue. So be patient, friends.

We have been advised by the successors of our vegetable seed business, E. C. Green & Son, of this place, that they are much pleased with the way in which our old customers are favoring them with their orders. They have received many letters of praise for the strains of seeds that we carried.

They have succeeded in obtaining a fine new bean which they intend to catalog the coming year. It is now being sent out to their customers free, with a general order for seeds they sell, on advance trial. We would advise our friends to send their order at once and request a trial package of the bean, for the stock is limited.

THE HAND POTATO-PLANTER OF THE GRAND TRAVERSE REGION.

The manufacturers of this little planter (see advertisement in this issue) are sending out a book that not only tells how to use the planter, but it is quite a treatise on potato-growing, and ought to be in the hands of everybody who grows potatoes, even if he does not have more than a little patch of early potatoes in his garden. I believe many people could plant their potatoes cheaper and better than to use a horse, even if the horse is standing idle in the stable, providing they once took a little pains to know how to use the implement. In the Grand Traverse region every man, woman, and child handles the planter as easily as you would a hammer or ax. They know how to use it from childhood up.

Of course, we furnish the hand potato planter just as we have for years past, either singly or by the dozen.

Write to-day for a free copy of the book, addressing them as follows: Potato Implement Co., Box 20, Traverse City, Mich., mentioning this paper.